Evaluation of Subsidies in Recovery of Landscape within the Operational Programme Environment

Michaela Štěpánková [1] | *Czech University of Life Sciences Prague, Prague, Czech Republic*
Miroslav Hájek [2] | *Czech University of Life Sciences Prague, Prague, Czech Republic*
Pavla Kubová [3] | *Czech University of Life Sciences Prague, Prague, Czech Republic*

Abstract

Public expenses are often evaluated in terms of their effectiveness. This is caused by the character of financial resources and by the fact that public activities are dependent on those resources. This paper addresses the evaluation of financial subsidies within the Operational Programme Environment 2007–2013. From the perspective of financial subsidies, the Operational Programme Environment was the second largest programme in the Czech Republic offering almost 4.92 billion EUR. Verifying the effectiveness of the management of these public funds is highly desirable, as the use of public funds is associated with a risk of over-exploitation. The main aim of the paper is to evaluate the supported projects and to offer new indicators. The assessment was based on the 3E survey. The results of the research confirmed that among the evaluated projects the desired outcomes are achieved at greater efficiency.

Keywords

Alley, efficiency of projects, forest ecosystem, landscape-related activities, operational programmes, recovery of landscape

JEL code

H40, H43, H50, O22, Q23

INTRODUCTION

Public spending is often criticised because of low efficiency (Chu et al., 1991). The general approach for assessing the effectiveness is based on the rule that the realised public project makes sense when the benefits obtained exceed its costs (Musgrave et al., 1994). Selecting appropriate methods, particularly in the environmental field (Pearse et al., 2006), is crucial when trying to quantify benefits. Public expenditure

[1] Faculty of Forestry and Wood Sciences, Kamýcká 129, 165 00 Prague 6 – Suchdol, Czech Republic. E-mail: stepankova@ssc.cas.cz.
[2] Faculty of Forestry and Wood Sciences, Kamýcká 129, 165 00 Prague 6 – Suchdol, Czech Republic. E-mail: hajek@fld.czu.cz.
[3] Faculty of Forestry and Wood Sciences, Kamýcká 129, 165 00 Prague 6 – Suchdol, Czech Republic. Corresponding author: e-mail: kubova@fld.czu.cz, phone: (+420)731111149.

programmes are compared to the costs and effects of their goals during economic analysis. This is based on the definition of the expenditure programme and clearly defined objectives and assessment criteria, which include the economy, efficiency and effectiveness.

The programmes discussed were often part of the Operational Programme Environment (OPE), which falls under the programming period 2007–2013, under thematic operational programmes within the Convergence objective. In terms of financial support, it was the second largest Czech operational programme. Projects included in this operational programme were funded by the European Regional Development Fund and the Cohesion Fund. For the period 2007–2013, 4.92 billion EUR was allocated. Projects implemented in the OPE under the National Environmental Policy of the Czech Republic are intended to contribute to the improvement of the state of the environment with a significantly higher efficiency of the implemented measures. Cherry et al. (2012) also emphasise dependence on providing grants for environmental policy whose measures, based on the adopted environmental policy, are much more efficient. Checking the effectiveness of the management of these public funds (Hájek, 2000; Hudon et al., 2009; Cherry et al., 2012; Pukkala, 2011) is highly desirable as the use of public funds is associated with a risk of over-exploitation and corruption (Barone et al., 2015). For European funds, the risk is higher because a larger amount of funds is involved, beyond the normal scope of the national economy.

The main aim of the paper is to evaluate the supported projects and to offer new indicators. The ambition is also to define new methods and discuss its use for evaluating projects in the given area. The research is focused on projects supported by the Operational Programme Environment, particularly on landscape recovery.

1 SURVEY AND LITERATURE REVIEW

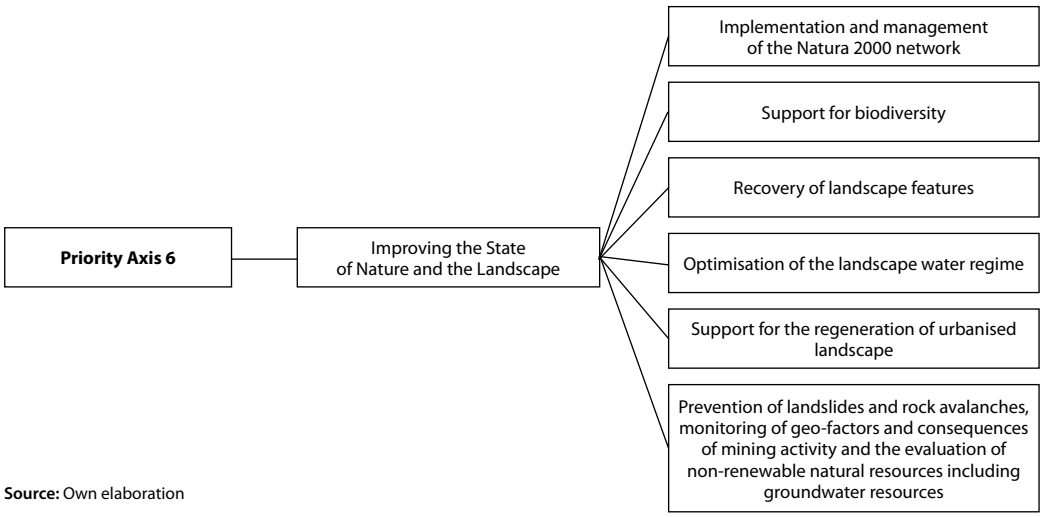
The paper is focused on landscape recovery projects. The processes of landscape change are complex, exhibiting spatial variability (Drummond et al., 2017). These projects are contained in Priority Axis 6 OPE (see Figure 1). The aim of this priority axis is to address the problem as a significant intervention into the landscape structure, which causes excessive fragmentation of the landscape. This is influenced by various life forms, habitats and ecosystem services (Fisher et al., 2009; Mitchell et al., 2015). OPE has therefore focused primarily on the implementation of elements of territorial systems of ecological stability (TSES) and the overall improvement of natural conditions in the open countryside, in the woods or in specially protected areas and Natura 2000. According to Geitzenauer et al. (2017) Natura 2000 is an ambitious and complex venture that requires funding to be successful.

Area of support (6.3 Recovery and landscape) focuses on strengthening ecological stability (Termorshuizen et al., 2007), namely through the creation and restoration of landscape elements, building elements of territorial systems of ecological stability (TSES) and increasing the stability of forest ecosystems (Mandre et al., 2010). It helps to regenerate and improve the age and species composition of forests, increasing the number of landscape features and improving the ecological stability of the landscape. The supported area was carried out in relation to the objectives of the State Environmental Policy 2004–2010, the State Programme of Nature and Landscape, the Biodiversity Strategy of the Czech Republic and the Strategy for Sustainable Development. A complete list of supported areas in Priority Axis 6 is provided in Figure 1 below.

Economic analysis is performed based on the methodology for the evaluation of the expenditure programmes under the so-called 3E approach (Provazníková, 2009; Ochrana et al., 2010). Methods currently in use for generating performance indicators have, according to Liu et al. (2010), limitations, especially when applied to public sector organizations. In general terms a comparison of inputs and outputs was undertaken, where the inputs are investment costs, i.e. the subsidies provided, and the outputs are the benefits described in the project. The financial evaluation was carried out based on the efficiency, which assesses the value of the results relative to the inputs. The higher this ratio is,

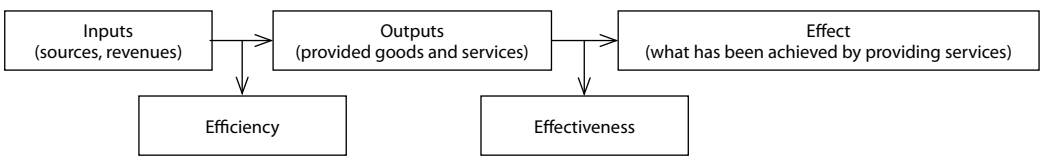
the greater the efficiency. The effectiveness was also assessed as to what extent and at what quality level the aims were fulfilled. Schematically, the efficiency and effectiveness can be illustrated as follows, see Figure 2 (Provazníková, 2009).

Figure 1 Overview of areas of intervention under Priority Axis 6



Source: Own elaboration

Figure 2 Efficiency and effectiveness



Source: Provazníková (2009), own elaboration

Logically, the project can be evaluated in terms of these three categories of criteria (Behn, 2003), and for each one there will need to be some measures of the indicators as well as some standards. According to Goddard (1989) the public sector has traditionally used the 3E approach, but according to Liu et al. (2010) the 3E approach has a weakness – it ignores efficiency. Does the system actually produce the outputs that it is supposed to? This question is answerable by efficiency (Checkland et al., 1990). Midwinter (1994) argues that economy can be seen as part of efficiency. Johnsen (2005) suggests the 3E approach too, but with analysis of efficiency, effectiveness and equity. Equity can be an explicit requirement of public organizations but not of private ones.

Any assessment based on the 3E survey attains the target of the monitoring indicators. Specific objectives of this area of support, "Recovery of landscape" are as follows: increasing the number and area-based and restored landscape features and elements of territorial systems of ecological stability (TSES), improving natural conditions in forests and improving the soil condition.

2 METHODS AND METHODOLOGY

The basis of the paper is the list of approved OPE projects, issued by the Czech State Environmental Fund (SEF). The specific data was drawn from individual projects in the area of support 6.3 provided

for the purposes of this paper. The official monitoring indicator related to the area of intervention 6.3 was determined by the number of projects aimed at improving the state of nature and landscape (target 150 projects).

The monitoring indicators were set for individual projects, which should be met in implementing the projects, by the recipients of the subsidies. In the approved projects, their number in individual regions of the Czech Republic, their status and financial allocation were studied. Given the difficulty of setting benchmarks in this area on one hand and considerable subjectivity on the other hand, unambiguous definitions and proving compliance were assessed in terms of the indicators chosen.

Table 1 shows the classification methodology of the projects into eight categories.

Table 1 Methodology for the inclusion projects of the Priority Axis 6 into categories

No.	Category	Category description
1	Felling	Events with a large amount of logging that were not part of the treatment of landscape plantings or avenues.
2	Landscaping measures	All projects of landscaping measures that directly define the description of the project, including the transfer of biodiversity and USES projects in a wider range.
3	Planting trees outside forests	Categories include the planting of trees outside forests; primarily including planting trees and greenery, without extensive processes eliminating previous vegetation.
4	Restoration of woods	Projects associated with the restoration of forest areas.
5	Restoring alleys and avenues	Classified projects that directly and concretely primarily involve the planting or restoration of alleys and avenues.
6	Treatment of trees and restoration of significant and memorable trees	Only significant and memorable trees.
7	Creation of documentation	Creation and promotion of documentation.
8	Unsorted	No suitable classification found in the above categories.

Source: Own elaboration

The authors divided the grants, according to individual projects awarded, into seven categories and in these intervals the median, the trimmean, a variation range *R* of differences between the estimated and actual expenses were calculated. The median is a set of values divided into two equal parts, it being understood that at least 50% of the values are larger than the median and 50% of the values are smaller than the median (Budikova et al., 2010).

The article also calculated the average excluding the extreme values of the differences between the estimated and actual project costs (trimmean), which are included in the calculations (in this case 5%). The authors determined the average value of the data, so that it separates within 5% of the highest and lowest values of the file, and calculated the average value of the inner part of the plurality of data values. Finally, the variation range *R,* which is a statistical characteristic, expresses the degree of variability of the statistical set. It is the difference between the highest x_{max} and lowest values x_{min} of the quantitative character.

The application of the principles of the 3E Public Procurement Act does not impose or mention. However, this obligation results from a number of other laws, such as the Act on Budgetary Rules, the Act on Municipalities, the Act on Regions, the Act on Property of the Czech Republic, the Act on Financial Control (Pavel, 2008). The Provazníková´s (2009) survey shows that auditing is preferred when auditing the economy and that the 3E method is not always applied. Provazníková (2009) points out that these indicators may conflict with each other. Based on the principle 3E projects were evaluate from three perspectives – efficiency, effectiveness and economy. Economy applies only to inputs, effectiveness refers to inputs and outputs (or result or impact) and efficiency in terms of objectives (and expected outcomes) and the results or impact. Internationally recognized definitions are defined in the Standards of Auditing of the International Organization of Supreme Audit Institutions INTOSAI.

2.1 Efficiency

Efficiency is a comparison between inputs used in a certain activity and resulting outputs (Miguel et al., 2009; Mentzer et al. 1991). Efficiency refers to the extent to which outputs are attained while minimising production costs. Another way to look at efficiency is using the approach of Achabal (Achabal et al., 1984): "*the allocation of resources across alternative uses … [it] is achieved when the marginal productivity per unit of price is equated across all resources that contribute to the firm's output*." Efficiency means the use of public funds to ensure an optimum level of achievement of the objectives in fulfilling the assigned tasks. In other words, the degree of achievement of the objectives and the relationship between the intended and the actual impacts of the activity are understood to be useful. An action that achieves the goals is meaningful without the involvement of other activities and / or undesirable unintended consequences. The principle of efficiency requires the attainment of the objectives of the activity intended effects. The criterion of efficiency examines the economic rationality of the resources used (Ochrana et al., 2010).

The efficiency was assessed as the ratio of the benefits of implementing the project to the costs of doing so (Synek et al., 2015). The efficiency analysis was performed based on the characteristics of the programme, which should enhance the region, especially those with higher fragmentation of the landscape. As a criterion for assessing the number of projects by region, data on the habitat fragmentation is utilised (Andel, 2013). It can deduce the extent of the number of projects related to the regions corresponding to the terms of the focus of the programme.

To determine the tightness of dependence (relative strength) of two variables (the extent of fragmentation – an indicator of effective mesh size in 2005 (Andel, 2010) and the number of approved projects (up to 2015), we measured statistic dependence by using Pearson's correlation coefficient (1):

$$r = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2 \sum_{i=1}^{n}(y_i - \bar{y})^2}} \tag{1}$$

The random variable x_i and y_i are quantitative random variables with a common two-dimensional normal distribution.

Effective mesh size – m_{eff} is the numeric indicator of landscape fragmentation barriers broken down into sub-isolated areas. The indicator is based on the calculation of the probability that two individuals at random locations in the studied area will be located in one area, therefore they are not separated by a barrier (Andel, 2010).

From the available data, it was possible to state the achievement of the official objectives of the programme and there was no obvious greater benefit from the implemented projects.

2.2 Effectiveness

Effectiveness refers to the connection between inputs, outputs and more general, secondary type objectives or outcomes (Miguel et al., 2009; Kumar, 2009). We can say that effectiveness is the capability of producing a desired result. The effectiveness corresponded with the extent to which the project's aims were fulfilled and where economy was concerned, the extent to which the public finances provided were spent (Vochozka et al., 2012). Concerning economy, we see the attainment of the objectives at the lowest possible cost, thus minimising the costs while respecting the objectives of the project and still maintaining adequate quality. Effective is an activity that optimizes the use of organizational / program / activity resources to generate outputs, i.e. achieving maximum output from given sources or achieving a given output with minimal resources and maintaining the quality of outputs. The principle of effectiveness requires the best possible relationship between the resources used for the activity and the effects achieved (Pavel, 2008, 2009).

2.3 Economy

Economy in this context means the use of public funds to ensure that tasks are assigned with the lowest possible use of these resources, while respecting the appropriate quality of the tasks to be achieved, i.e. minimizing the cost of resources (inputs) used for the activity with respect to the corresponding quality (Pavel, 2008). Pavel (2008) adds that the principle of economy requires that the resources used by the entity in carrying out its activities are available at the right time, in sufficient quantity, at the appropriate quality and at the most advantageous price.

The ambition is to describe the differences between the estimated and actual costs compared to the grant amount awarded, which corresponds to the economy by the 3E approach. It will determine whether objectives were achieved economically, i.e. with lower costs.

The economy and effectiveness cannot be identical, but there is a close link between these principles under the European legal norms[4] (Sapíková, 2013; Koch, 2013). Therefore, economy and effectiveness will be evaluate under subchapter 3.2 together.

3 RESULTS

The number of approved projects (up to 2015) in support of 6.3 in the database of approved projects under OPE is 837 (see Table 2). The distribution of the projects in the Czech Republic is given in Table 2, in which the approved projects assigned to individual regions of the Czech Republic are shown. It is then clear that the calls lead to the further approval of new projects. The success of individual regions, however, remains the same. Further evaluation of the Priority Axis 6 of the OPE support 6.3 assesses the status of the approved projects. Projects can be in the following states: financing of the project completed, the project is finally closed, project implementation, project completed, approved for financing, project expenditures certified.

Table 2 Number of approved projects in Priority Axis 6 in support of 6.3 up to 2015 disaggregated by region in the Czech Republic

Region	Number of Projects
South Bohemia Region	52
South Moravia Region	238
Karlovy Vary Region	25
Hradec Kralove Region	33
Liberec Region	43
Moravia-Silesia Region	76
Olomouc Region	71
Pardubice Region	23
Pilsen Region	24
Central Bohemia Region	51
Usti Region	49
Vysočina Region	59
Zlín Region	93
Total	837

Source: Own elaboration (Internal database of the State Environmental Fund CR, 2016)

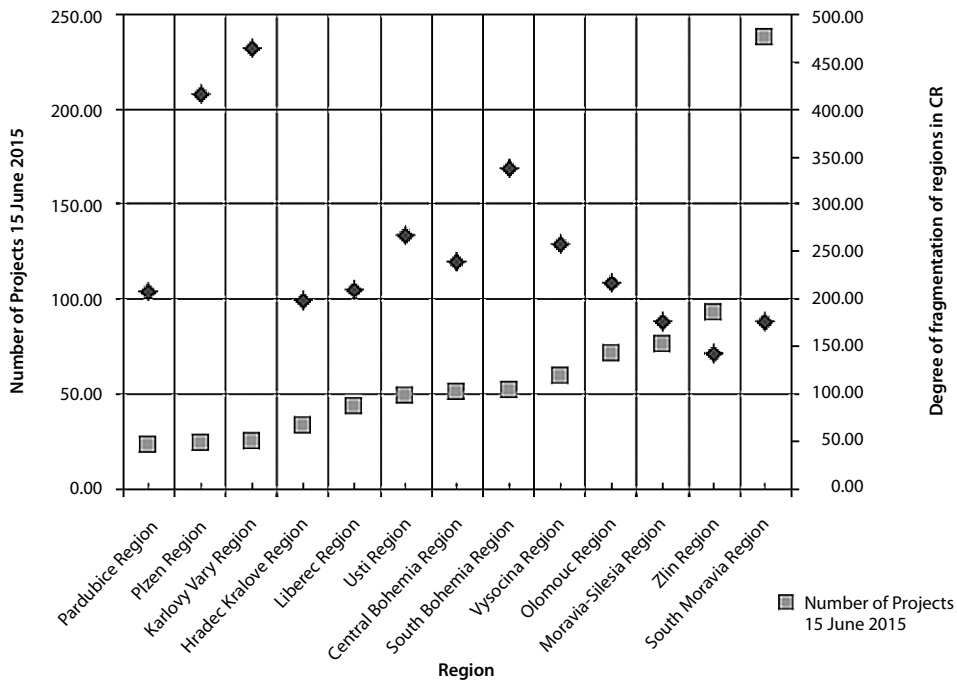
[4] Directive 2004/17/EC of the European Parliament and of the Council of 31st March 2004 coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors and Directive 2004/18/EC of the European Parliament and of the Council of 31st March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts.

Significant changes were recorded in 2015 – there were new projects, while there were also significant changes in conditions. There are 50 projects that have been approved for funding, of which 44 were approved in 2015 and show no paid resources. Added to this, there are also finally closed projects and projects under implementation. At the same time, there are a substantial amount of projects awaiting certification of their expenses.

3.1 Efficiency

There are also two newly added projects that are on hold. The following Figure 3 shows the value of the degree of fragmentation of regions in the Czech Republic and the number of projects submitted in the regions of the Czech Republic (excluding the capital Prague) for evaluation of efficiency.

Figure 3 The degree of fragmentation and the number of projects by region in 2015



Source: Own elaboration

Data on habitat fragmentation is utilised as a criterion of efficiency (Andel, 2013). According to Andel (2010), the importance of the issue of fragmentation in the future will continue to increase, not only due to the result of direct pressure from the further construction of roads and settlements, but also in relation to indirect effects such as global climate change. The conclusions of Andel (2010) clearly demonstrate the increasing fragmentation of the landscape in the Czech Republic over the past 25 years and show a pessimistic prognosis for the future due to the decrease in the total area of UAT (Unfragmented Area by Traffic) and continuous reduction in their size and their quality.

These trends are in line with the development of automotive and residential construction and transport infrastructure. In terms of the share of UAT on the areas of the regions in the period 1980–2040, it can be stated that there are huge differences between individual regions in the Czech Republic. As reported by Andel (2010), the South Bohemian Region and Pilsen currently have the highest proportion

of unfragmented territories (in 2040, it is predicted that 74.15% of the area of the region will be UAT), whereas the worst situation is in the Moravian-Silesian region, South Moravia and Central Bohemia (in 2040, it is predicted that 37.25% of the area of this region will be UAT).

Pearson's correlation coefficient equals –0.45, which indicates a weak indirect dependence of the number of projects on the degree of fragmentation. That means that the higher the degree of fragmentation, the lower the number of projects in this region.

3.2 Economy and effectiveness

There is a close link between these principles under the European legal norms (Sapíková, 2013). Therefore, economy and effectiveness will be evaluated under this subchapter together.

The key parameter for evaluating projects is primarily the funding. The amount of support is apparent from the beneficiaries, which are local governments and their associations, natural and legal persons (as well as those entrusted with the management of state-owned forests), civic associations and churches, public research institutions, organisations, government (excluding land offices), administrators of watercourses and catchment areas.

Results on redistributing finance projects support 6.3 (to 2015) are indicated in Table 3.

Table 3 Redistributing finance projects support 6.3 to 2015

Total cost of the operation (CZK)	Total eligible expenses (CZK)	Amount allocated (CZK)	Paid out funds (CZK)
2 241 136 517	2 052 763 630	1 918 814 224	1 387 469 956

Source: Own elaboration (Internal database of the State Environmental Fund CR, 2016)

Redistributing finance projects support have increased negligibly over a period of about half a year with paid resources, by nearly 17 million CZK. The ratio of total aid approved and disbursed funds increased to 72%. Up to 2015, 109 projects were registered for which payment has not been made. Total authorised aid of these projects amounted to 212 302 212 CZK. As stated in the methods, in terms of the 3E, there is a need to monitor the following: effectiveness, economy and efficiency. In terms of the effectiveness it is necessary to assess whether the project objectives have been achieved. According to the fulfilment of the monitoring indicators provided by the SEF (State Environmental Fund) to 2015, the project objectives are met more than 71% of the time. This value is influenced by a large number of projects that are still in progress. Targets (m) in the form of monitoring indicators are shown in Table 4. However, the question remains as to whether the objectives were defined correctly from the outset and whether their performance in such a form is at all correct. The numbers of projects that have committed to meeting the above objectives are also presented in Table 4.

Table 4 Overview of the number of projects and monitoring indicators (up to 2015)

Monitoring indicator	Number of projects
Total length-loaded and regenerated alley	14
Total length of start and reclaimed landscape elements (in the case of linear elements)	422
The total area on which the measures were implemented to promote biodiversity	2
The total number of trees planted and treated	30
The total number of established and reclaimed landscape elements	611
Area revitalised	518
Number of measures taken in connection with the recovery of landscape structures	124
Number of measures taken in connection with the promotion of biodiversity	1

Source: Own elaboration (Internal database of the State Environmental Fund CR, 2016)

From the above, it is clear that the individual projects have to meet more than one objective (*m*). Only 144 of the projects stipulated meet only one objective. It should be noted that these indicators have no explanatory value, do not express how much and what quality was supported by the completed grants. Generally, it can be stated in which area the projects were realised in the area of support 6.3 and what was realised (but not in detail). A more appropriate indicator would be an accurate account, for example in the form of the indicator "the number of trees planted at the prescribed quality" and "the percentage of their death", from which it is clear exactly what has been done and what quality was achieved.

22 projects set out to reach the economy indicator, of which 18 have already met their goal, 17 of which were reimbursed funds. It is, therefore, compared to only 17 projects. All of these projects met their objectives in the form of monitoring indicators, but only one was even slightly increased (with respect to effectiveness). 7 grant recipients behaved economically because their projects exhibit financial savings while meeting their objectives. If a project is financed from one's own resources, the participants act efficiently; such effort is also obvious when the grant recipients are attempting to use up all the funds provided. Two projects did not record any savings, two recorded more than 4%, but the others amounted to almost 23%. Such savings, while meeting the planned targets, are relatively high.

We assess the efficiency ratio of the input and the output efficiency of the resources invested and the benefits they earned. We compare the results and impact of the sources used. Efficiency is often seen as cost efficiency. Achieving high efficiency in a competitive environment is the source of success, which leads to increased profits. In the classical market environment, we can assess the accuracy of the allocation of financial resources according to the ability to compete. The market test proved that public finance resources were insufficient. The evaluation involved only projects with a single objective as this enabled the determination of the cost per unit in CZK. This also includes the projects which have already met their objectives and their required subsidies have therefore been paid. The assessment of efficiency of the projects dealing with the total duration of their initial stages and with reclaimed landscape elements/ TSES (the Territorial system of ecological stability when concerning linear elements) is based on Table 5.

Table 5 Monitoring indicators of their performance, financial summary (up to 2015)

Event title	Target value (*m*)	Real value (*r*)	Total grant approved	Funds reimbursed (CZK)	Saved (CZK)	Price of 1 metre according to reimbursed funds (CZK)
Restoration of vegetation in the municipality Bystřany	940	940	380 109	380 109	0	404.37
Maintenance and restoration of the trees at Pacov	4 000	4 000	638 975	638 975	0	159.74
Regeneration green Klatovy	15 200	15 200	8 474 051	8 420 747	53 303	554
Restoring alley Velešovice	900	900	200 326	200 326	0	222.58
Revitalisation avenue of lime trees Ratibořice	1 020	1 020	354 375	354 375	0	347.43
Treatment of linden alley Milevsko	560	560	208 910	208 910	0	373.05
Alley along the path in the Humňany	2 800	**2 802.79**	3 699 065	3 699 032	32	1 319.77
Planting alley along the road Kazůbkova	1 500	1 500	368 718	358 986	9 732	239.32
Regeneration of alley at Broumov	3 000	3 000	459 073	450 162	8 911	150.05
Regeneration of alley in Lipky	857	857	793 398	793 398	0	925.78
Renewal project road alley road II / 408	25 000	25 000	1 977 477	1 824 786	15 2691	72.99
Restoration of the historic avenue Castle Veveří	81	81	239 661	239 661	0	2 958.78
Stabilisation and treatment Valdštejn linden alley	815	815	937 226	937 226	0	1 149.97
Fruit tree alley Litohoř	475	475	214 575	214 575	0	451.74
Regeneration of dirt track in Sychrov nad Jizerou	1 335	1 335	758 462	713 494	44 969	534.45
Bird alley in Křinice	65	65	102 773	87 879	14 894	1 351.99
Planting alley in rural Dolní Benešov	713	713	287 171	287 171	0	402.76

Source: Own elaboration (Internal database of the State Environmental Fund CR, 2016)

The price of one metre-loaded and regenerated landscape elements in the individual projects is diametrically different. However, it is logical that the restoration of a historic avenue is more expensive than the restoration of a road alley. However, if we compare only the renewal of road alleys, we compare the prices of 159.74 CZK, and 150.05 CZK, and 72.99 CZK per 1 metre. The first two values are comparable, with the third having a significant impact on the number of units (assuming the higher the number of metres, the lower the price per 1 metre). This project also has the highest efficiency. For the indicator "The total number of trees planted and treated" cannot be compared to the performance because there is only one project with such a target indicator (*m*). Data for the indicator "The total number of established and reclaimed landscape elements" is shown in Table 6.

Table 6 Monitoring indicators, their fulfilment, financial summary (up to 2015)

Event title	Target value (*m*)	Real value (*r*)	Total grant approved (CZK)	Funds reimbursed (CZK)	Saved (CZK)	Price of 1 part according to reimbursed funds (CZK)
Restoration and maintenance of dam stands Třeboň	10	10	1 741 420	1 489 427	251 993	148 942.69
Treatment of memorable and significant trees Ralsko	3	3	74 045	74 045	0	24 681.60
Treatment of avenue of lime trees in the village Hořátev	1	1	582 120	582 120	0	582 120
Treatment, retention and completion of oak alley Mimoňsko	4	4	966 740	966 650	90	241 662.60
Telč, Linden alley – treating trees	1	1	508 884	508 884	0	508 883.98
Comprehensive treatment of significant trees Military Domain Boletice	5	5	90 715	84 415	6 300	16 882.92
Revitalisation alleys and avenues KSÚSV	2	2	2 164 959	2 164 959	0	1 082 479.50
Treatment with significant vegetation line Hluboká nad Vltavou	1	1	658 256	658 256	0	658255.50

Source: Own elaboration (Internal database of the State Environmental Fund CR, 2016)

10 projects started with the indicator "total number of established and reclaimed landscape elements", of which 8 have already met their goal. The first of these projects did not use almost 15% of the approved assistance and the savings are, therefore, considerable. This project is, therefore, the most economical and effective, ranking as the third of all projects when considering price per unit. However, it should be noted that the effectiveness of this form is impossible to evaluate. The indicator has no meaningful value, because the price of one "piece" of land-loaded and regenerated element can be up to 64 times higher. The same is evidenced by the indicator "The number of measures implemented in connection with the recovery of landscape structures" in Table 7. The effectiveness again cannot be clearly assessed because the projects are completely different and it would be inappropriate to compare the price. The winner and loser are obvious at first glance, but to compare the price of 25 thousand CZK and 6.1 million CZK is not logically appropriate. This objective was realised in 6 projects, 5 of which have already fulfilled thei objectives.

The "Area revitalised" in hectares, recorded the most projects (105 of them) with this one goal. Of these, 91 projects have already accomplished their goal. To simplify, the authors are presenting an overview of 5 projects only, in Table 8.

4 DISCUSSION

It is clear from the results that the use of the 3E analysis extends the view on the effectiveness of the implemented projects and program 6.3 in the Priority Axis 6 OPE. There are major differences where the economy and efficiency are concerned in the projects and program 6.3 in the Priority Axis 6 OPE for the aforementioned purpose. Savings amount to 33%, which is certainly not negligible. One project not only met the goals set, but at the same time exceeded their performance by 12% while saving more than 25%. Based on that sample, it allows the authors to state that grants recipients have generally behaved

Table 7 Monitoring indicators, their fulfilment, financial summary (up to 2015)

Event title	Target value (*m*)	Real value (*r*)	Total grant approved (CZK)	Funds reimbursed (CZK)	Saved (CZK)	Price of 1 part according to reimbursed funds (CZK)
Developing forest management plan in the National Park Podyjí	1	1	2 827 562	2 704 949	122 613	2 704 949.22
Plan buffer zone Podyjí	1	1	9 425 445	9 425 445	0	942 545
Creation of forest management plans for forest management in the Krkonoše Mts. (Giant Mountains) National Park	3	3	23 877 298	18 417 933	5 459 365	6 139 311.07
Maintenance of memorial trees Palvínov	20	20	599 341	573 524	25 817	28 676.20
Improved care for the memorial of Přílezy	2	2	50 004	50 004	0	25 002

Source: Own elaboration (Internal database of the State Environmental Fund CR, 2016)

Table 8 Monitoring indicators of their performance, financial summary (up to 2015)

Event title	Target value (*m*)	Real value (*r*)	Total grant approved (CZK)	Funds reimbursed (CZK)	Saved (CZK)	Price of 1 ha according to reimbursed funds (CZK)
Reconstruction Sobotovická niva Floodplain	5.2	5.2	152 183	152 183	0	29 265.92
Restoring solitary oaks in Soutok	0.25	0.25	508 031	473 380	34 651	1 893 520.72
Restoring fir Slavkovský forest	3.66	3.66	636 916	636 916	0	174 020.66
Adaptation park castle Sádek	2.97	2.97	2 582 295	2 367 948	214 347	797 289.01
Improving oak, age and spatial composition of forests Vápenice	18.14	18.14	961 356	961 356	0	52 996.16

Source: Own elaboration (Internal database of the State Environmental Fund CR, 2016)

economically. Here it is apparent that assessment of the efficiency cannot be easily performed, since individual projects have quite different objectives and, therefore, costs. Comparable projects dealing with reforestation in the areas of air quality, price per 1 ha then range between 19 and 80 thousand CZK, which at first glance is basically ineffective because the 4 times higher costs are a considerable difference. The database of approved projects up to 2015 was subjected to an elementary statistical analysis. Mean values relating to the financial areas are shown in Table 9.

Table 9 Mean values of approved projects up to 2015

Mean value (CZK)	Total costs of the operation (CZK)	Total eligible expenses (CZK)	Amounts allocated (CZK)	Paid out funds (CZK)
Arithmetic Mean	2 677 582	2 452 525	2 292 490	1 664 754
Median	1 075 898	1 015 688	931 392	696 873
Mode	170 000	382 000	966 000	0

Source: Own elaboration.

The average authorised aid was EUR 2.3 million CZK. The median, a value that divides a series of increasingly aligned results in two equally large halves, with the aid approved of 931 thousand CZK. Modus (the value that frequently occurs in the cohort) is approved for support of 966 thousand CZK. Funds paid to the mode equals 0, since nothing has been paid yet for a considerable number of projects. Table 10 below lists the categories of the projects listed according to the granted aid in CZK and an elementary statistical analysis of the data drawn from the SEF (State Environmental Fund) (the difference between the estimated and actual costs).

Table 10 Elemental statistical analysis of the difference between the estimated and actual costs (CZK)

Category of allocated grants in intervals (CZK)	Arithmetic Mean	Median	Variation Range *R*	Trimmean
<0:300,000)	14 632	6 040	99 348	13 644.53
<300,000:500,000)	28 455	15 274	123 009	27 230.96
<500,000:1,000,000)	51 487	26 400	318 724	47 690.71
<1,000,000:2,000,000)	90 348	28 982	953 196	76 522.36
<2,000,000:4,000,000)	201 604	61 000	1 235 085	189 187.4
<4,000,000:10,000,000)	550 564	145 238	2 847 027	550 564.3
<10,000,000:100,000,000)	3 930 475	1 926 557	29 598 715	3 930 475

Source: Own elaboration

As shown in Table 10, the elementary statistics were calculated from the graduated intervals of the grants. For example, for the projects approved up to 300 000 CZK, the median of the difference between the estimated and actual costs is 6 040 CZK (the trimmean is 13 645 CZK). On the other hand, for projects in the interval from 4 000 000 to 10 000 000 CZK, the median is equal to 145 238 (the trimmean is 550 564 CZK). After rejection of the projects under implementation up to 2015, real costs are, on average, 7.24% lower than estimated. The average value of the differences in the estimated and actual costs of the already implemented projects up to 2015 is 236 266 CZK. Support Area 6.3 is committed to achieving the objective of the indicator in the number of projects aimed at improving the state of nature and landscape. There are 150 projects in the desired state. The monitoring indicator was met. Therefore, it can be stated that in terms of the performance criteria, it is effective to support them (Zoppi and Lai, 2011). Only those projects were relevant, whose financing has already been completed, those that were finally concluded or terminated their implementation and project expenditures were certified. In this case, of course, we get different results, namely in the area of intervention 6.3 for 380 projects which less than 708.5 million CZK had been paid.

The efficiency was also evaluated by the supported projects in various regions. Using the methodology of Andel (2010), regarding the degree of fragmentation of the landscape by region, it was found that the efficiency support in the case of the South Moravian Region was high because most of the projects were supported there (238), and the landscape is the most fragmented. It can negatively evaluate the efficiency in the Central Region, which is also highly fragmented, but only 51 projects were supported there.

The programme can generally be positive in terms of increasing the number and area-based and restored landscape features and elements of territorial systems of ecological stability. As a result of a weak indirect dependence of the number of projects on the degree of fragmentation, inappropriate spatial distribution of the projects that should have primarily been directed to highly fragmented regions can be considered as a negative.

From the perspective of efficiency, the supported projects can be evaluated positively, because an average saving of 7.24% has been achieved in compliance with the planned parameters. It is necessary to assess the allocation of resources within the approved projects. The outstanding 485.6 million CZK represents almost 25% of the budgets of the approved projects amounting to 1 918 million CZK. It is certainly a negligible number. In addition to the specific programming period 2007–2013, the implementation of all projects should have been completed and should also have been financially resolved. Rejecting the funds at such level must be attributed to the fact that this priority axis had not been maintained. As a result, the calls for the projects had to be closed later than in 2013. In 2014, a total of 10 calls were declared, the last of which was entered on the 14th of November 2014. In 2014, there were 170 approved projects within the area of support 6.3, in 2015, there were 44 projects.

CONCLUSION

The total financial allocation to this area of implementation was 77.925 million EUR. All approved projects in this area were individual projects; no large projects exceeding 25 million EUR in budget were implemented in area 6.3 nor, indeed, in Priority Axis 6. From the perspective of 3E, the OPE projects in the area of support 6.3 were evaluated by researching the efficiency, economy and effectiveness. In terms of the efficiency, we evaluated the achievement of the project objectives. The current performance is equal to 71% and it is expected that by the end of the implementation of the 2007–2013 programming period in 2017, the objectives will be met. A fundamental recommendation is to accurately identify and quantify the programme objectives, so that it is easy to measure their performance and so the explanatory values would be quite obvious. The economy itself helps to solve the attainment of the objectives at the lowest possible cost. A considerable number of projects minimised their expenses, obtained their goals while maintaining the corresponding quality and still showed significant savings. Overall, however, the authors cannot say that all the projects were efficiently dealt with. Economy should be dealt with primarily from the design stage of the project where it is necessary that the overvalued project items are lessened.

ACKNOWLEDGMENT

This paper was supported by IGA, Project No. 43160/1312/3153.

References

ACHABAL, D., JOHN, H. M., MCINTYRE, S. H. Issues and Perspectives on Retail Productivity [online]. *Journal of Retailing*, 1984, Vol. 60, No. 3, pp. 107–129. <https://ssrn.com/abstract=1859566>.

ANDĚL, P. *Indikátory fragmentace krajiny*. Evernia, Liberec, 2010. ISBN 978-80-903787-7-3.

ANDĚL, P. Landscape Fragmentation Caused by Traffic and its Impact on Wildlife Migration. *Životné prostredie*, 2013, 47, 2, pp. 90–94. DOI: 10.2800/78322.

BARONE, G. AND NARCISO, G. Organized crime and business subsidies: Where does the money go? *Journal of Urban Economics*, 2015, 86, pp. 98–110. ISSN 0094-1190.

BEHN, R. Why measure performance? Different purposes require different measures. *Public Administration Review*, 2003, 63, 5, pp. 586–606.

BUDÍKOVÁ, M., KRÁLOVÁ, M., MAROŠ B. *Průvodce základními statistickými metodami*. Prague: Grada Publishing a. s., 2010. ISBN 978-80-247-3243-5.

DRUMMOND, M., STIER, M., MCBETH, J. et al. Assessing Landscape Change and Processes of Recurrence, Replacement, and Recovery in the Southeastern Coastal Plains, USA. *Environmental Management* [serial online], n.d., 56(5), pp. 1252–1271. Available from: Science Citation Index, Ipswich, MA [accessed: 16.5.2017].

CHERRY, T. L., KALLBEKKEN, S., KROLL, S. The acceptability of efficiency-enhancing environmental taxes, subsidies and regulation: An experimental investigation. *Environmental Science & Policy*, 2012, 16(1), pp. 90–96.

CHECKLAND, P., FORBES, P., MARTIN, S. Techniques in soft systems practice part 3: monitoring and control in conceptual models and evaluation studies. *J. Applied Systems Analysis*, 1990, 17, pp. 29–37.

CHU, K. AND HEMMING, R. *Public Expenditure Handbook: A Guide to Public Policy Issues in Developing Countries*. Washington D.C.: International Monetary Fund, 1991, p. 195. ISBN/ISSN: 978-1-55775-222-2.

FISHER, B., TURNER, R. K., MORLING, K. Defining and classifying ecosystem services for decision making. *Ecological Economics*, 2009, Vol. 68, pp. 643–653. DOI:10.1016/j.ecolecon.2008.09.014.

GEITZENAUER, M., BLONDET, M., DE KONING, J., FERRANTI, F., SOTIROV, M., WEISS, M., WINKEL, G. The challenge of financing the implementation of Natura 2000 – Empirical evidence from six European Union Member States [online]. *Forest Policy and Economics,* 2017 [cit. 2017-05-16]. DOI: 10.1016/j.forpol.2017.03.008. ISSN 13899341.

GODDARD, A. Are the '3Es' enough? *OR Insight*, 1989, 2, 3, pp. 16–19.

HÁJEK, M. *Efektivnost výdajů z veřejných rozpočtů na ochranu životního prostředí*. Ústí nad Labem: Univerzita J. E. Purkyně, 2000.

HINDLS, R., HRONOVÁ, S., SEGER, J., FISCHER, J. *Statistika pro ekonomy*. Prague: Professional Publishing, 2007. ISBN 978-80-86946-43-6.

HUDON, M. AND TRACA, D. On the efficiency effects of subsidies in microfinance: an empirical inquiry. *World Development*, 2009, 39, pp. 966–973. DOI: 10.1016/j.worlddev.2009.10.017.

JOHNSEN, A. What does 25 years of experience tell us about the state of performance measurement in public policy and management? *Public Money and Management*, 2005, 25, 1, pp. 9–17.

KOCH, M. Assessment of the Effectiveness of the Information System Using HOS. *Trendy ekonomiky a managementu*, 2013, pp. 7–16.

KUMAR, S. AND RACHITA, G. Measuring efficiency, effectiveness and performance of Indian public sector banks. *International Journal of Productivity and Performance Management*, 2009, 59, 1, pp. 51–74.

LIU, W. B., et al. The 3E methodology for developing performance indicators for public sector organizations. *Public Money & Management*, 2010, 30, 5, pp. 305–312.

MANDRE, M., KIVISTE, A., KOSTER, K. Environmental stress and forest ecosystem. *Forest Ecology and Management*, 2010, 262, pp. 53–56. DOI: 10.1016/j.foreco.2010.10.008.

MENTZER, J. T. AND KONRAD, B. P. An efficiency/effectiveness approach to logistics performance analysis. *Journal of business logistics*, 1991, 12, 1, p. 33.

MIDWINTER, A. Developing performance indicators for local government: the Scottish experience. *Public Money and Management*, 1994, 14, 2, pp. 37–43.

MIGUEL, A. et al. Study on the efficiency and effectiveness of public spending on tertiary education. 3rd report, 2nd draft, Brussels: European Commission, Directorate-General for Economic and Financial Affairs, 2009. ISBN 9789279133657.

MITCHELL, M. G. E., SUAREZ-CASTRO, A. F., MARTINEZ-HARMS, M., MARON, M., MCALPINE, C., GASTON, K. J., JOHANSEN, K., RHODES, J. R. Reframing landscape fragmentation's effects on ecosystem services. *Trends in Ecology & Evolution*, 2015, Vol. 30, 4, pp. 190–198. DOI: 10.1016/j.tree.2015.01.011.

MUSGRAVE, R. A. AND MUSGRAVEOVA, P. B. *Veřejné finance v teorii a praxi*. Prague: Management Press, 1994. ISBN 978-80-247-5561-8.

OCHRANA, F., PAVEL, J., VÍTEK, L., MAAYTOVA, A., URBÁNEK, V. *Veřejný sektor a veřejné finance. Financování nepodnikatelských a podnikatelských aktivit*. Prague: Grada Publishing a.s., 2010. ISBN 978-80-247-3228-2.

PAVEL, J. *Základní analýza problematiky veřejných zakázek z pohledu 3E* [online]. Příloha č. B4, 2008. <http://www.portal-vz.cz/getmedia/2ca65af3-48a9-4cce-b4d2-d44f8d22baf2/3E_vs_principy_ZVZ_B4>.

PAVEL, J. *Veřejné zakázky v České republice*. Studie Národohospodářského ústavu Josefa Hlávky 2/2009, Prague, p. 105. ISBN 80-86729-47-8.

PEARSE, D., ATKINSON, G., MOURATO, S. *Cost-Benefit Analysis and the Environment*. Paris: OECD, 2006. ISBN 9264010041.

PROVAZNÍKOVÁ, R. *Financování měst obcí a regionů – teorie a praxe*. Prague: Grada Publishing, 2009. ISBN 978-80-247-2789-9.

PUKKALA, T. Optimizing forest management in Finland with carbon subsidies and taxes. *Forest Policy and Economics*, 2011, 13, pp. 425–434. DOI: 10.1016/j.forpol.2011.06.004.

SAPÍKOVÁ, L. *Perspektivy dalšího rozvoje veřejných vysokých škol v ČR s ohledem na právní regulaci jejich financování a hospodaření*. Brno: Masarykova univerzita, Právnická fakulta, 2013.

SYNEK, M. et al. *Podniková ekonomika*. Prague: C. H. Beck, 2015. ISBN 978-80-7400-274-8.

TERMORSHUIZEN, J. W., OPDAM, P., VAN DEN BRINK, A. Incorporating ecological sustainability into landscape planning. *Landscape and Urban Planning*, 2007, 79, pp. 374–384. DOI: 10.1016/j.landurbplan.2006.04.005.

VOCHOZKA, M. et al. *Podniková ekonomika*. Prague: Grada Publishing a. s., 2012. ISBN 978-80-247-4372-1.

ZOPPI, C. AND LAI, S. Urban development and expenditure efficiency in the 2000–2006 regional operational program of Sardinia. *Land Use Policy*, 2011, Vol. 28, pp. 472–485. DOI: 10.1016/j.landusepol.2010.10.001.