

# The Model on Estimating Economic Benefit of Nature-based Tourism Services of Territories of National Parks, Latvia

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*Abstract:* National Park is a protected area managed mainly for ecosystem protection and recreation. Park-related tourism can provide a range of benefits to destinations individuals, businesses, surrounding communities and national as well as regional and local economies. Tourism planning is the central issue which seeks to maximize the economic benefit and minimize the costs of tourism. In the base of it there should be researches and economic calculations that in territories of NPs in Latvia are not done before. That is why is clarified the scientific praxis about economic benefit, impact, value and indicators of nature-based tourism as well as calculation methods. By software STELLA on the basis of scientific arguments and findings is created an estimating model (map) of possible economical benefit of nature based tourism in NP's of Latvia. In conclusion there is shown an example how stochastic financial data of economic benefit is used in modelling results of calculations.

*Key-Words:* National park; Nature tourism; Economic impact; Economic value; Estimation economic benefit; Modeling

## 1 Introduction

According to the data in the year 2007 of United Nations Environment Programme – World Conservation Monitoring Centre (UNEP-WCMC) and World Commission on Protected Areas (WCPA) there are more than 120000 several nature protected areas in the world. [1] “National Park (NP) is a natural area of land and/or sea, designated to protect the ecological integrity of one or more ecosystems for present and future generations, exclude exploitation or occupation inimical to the purposes of designation of the area and provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible. NP's protected area managed mainly for ecosystem protection and recreation.” [2] In the Europe there are 359 NPs, four of them are established in Latvia during 1975 till 2007. [3]

In the territories of NPs opportunities of economical development are limited. Nature based tourism development is one of the appropriate economical development forms in territories of national parks. By United Nations World Tourism Organization (UNWTO) it means “all nature-based forms of tourism in which the main motivation of the tourists is the observation and appreciation of nature as well as the traditional cultures prevailing in natural areas”. [4]. Nature-based tourism creates 50 % of all international tourism in Europe. It increases 10-30%

per year, but global spending increases by 20 % per year. [5] Nature-based tourism activities are one of the fastest growing tourism market segments, currently covering 7% of all international arrivals. Tourism related activities provide over 200 million jobs. [6]

Economic impact of nature-based tourism is researched by Ashley, C.; Barnes, Beech, J.; J.I.; Conner, N.; Dixson, J.; Drumm, A.; Eagles, P.F.J.; Goodwin, H.; Lindberg, K.; Pearce, D.; Wells, M.P. and etc., whose area of economic researches have been popular, differently managed national parks in the world. In four national parks of Latvia such researches have not been made. According to Boniface, B. and Cooper, C. (2005), tourism planning is the central issue which seeks to maximize the benefits and minimize the costs of tourism, keeps balance for visitor satisfaction as well as the natural resource. [7]

## 2 Problem Formulation

As in the world, also in Latvia one of the strategic tourism resources is nature environment including this located in the territories of national parks. In the legislation and plans of nature protection in national parks of Latvia complex nature protection events are planned as well as tourism integration in the development of parks. However, in four national parks of Latvia, up to this time tourism development planning documents have not been

worked out, where the base should be the calculation of potential economic impact and value in regional as well as local level according to their disposition in the country. Management and development of national parks in the world mainly is provided by the support of state finance resources, but in national parks of Latvia the state funding is diverted to provision of nature protection functions. It is important for the tourism development, int. al., nature based tourism, to establish successful partnership between private – public sector. In this case public sector means administrations of national parks. In the result of successful cooperation between both groups of partners (private sector – local population, micro, small scale enterprises and public sector – administrations of national parks) could be increased profit from nature protected areas as tourism strategic resource which is transferred in tourism products. Researches of economic benefit of nature-based tourism products and services in territories of NPs in Latvia are not done before.

Measured, calculated indicators of economic input are usable in modelling mathematic systems what are also in management training process.

### **3 Problem Solution**

For solving the problem initially it is necessary to clarify the scientific praxis about economic benefit, impact, value and indicators of nature tourism as well as calculation methods. On the basis of scientific arguments and findings to create an estimating model of possible economical benefit of nature based tourism in NP's of Latvia. In elaborating the map of model system modelling software STELLA has to be used.

#### **3.1 Benefits of tourism planning in national parks**

An economic approach to the management of protected areas and other nature tourism destinations can help to identify ways of maximizing economical benefits. But one of the important challenges in managing tourism is to reach and balance between the benefits from visitor use and the maintenance of the natural environmental features of the area. When the use of the nature tourism destination is uncontrolled, maximizing economic benefits may result in irreversible damage to the environment. [8] It is responsibility of administrations of NPs to use tourism planning as development tool of NP territory development.

The benefits of tourism planning can be divided in two groups: (1) for those involved in delivering and developing at the destination, like: provides a set

of common objectives for all at the destination to follow and an integrating framework for future actions and decisions, etc.; (2) for the destination itself, because it optimizes the benefits of tourism to a destination and minimizes the negative impacts of tourism on the economy, environment and host community, etc. [7] Successful NP planning and management is likely to depend increasingly on an improved understanding of the needs aspirations of local communities and the nature, pattern and number of visitors. Park-related tourism can provide a range of benefits to destinations individuals, businesses, surrounding communities and national as well as regional and local economies. [9]

#### **3.2 Economical benefits of tourism in national parks**

The term “economic benefit” is quantifiable in terms of money, and it's not a synonym on term „the economic impact”. Economic impact has economy wide effect on employment, incomes produced by a decision, event, or policy. [10]

Benefits from tourism are viewed from both supply and demand sides, as well as both the positive and negative impacts of tourism. Different types of protected areas contribute different types and levels of benefits. [9] Impacts of nature-based tourism can measure at national, regional (in this case of one country), local (county and destination, because nature-based tourism can be as a catalyser on local economic development) levels. [11] Beside enhancing overall social benefits and improvement and conservancy of nature and cultural heritage at all levels overall economic benefits is an enhancing income – increasing tourism demand, tax revenues, gross national product and total economical effect, spread development (multiplier effect), employment, intersectoral linkages, etc. [12], [13]

Overall economic benefits can be divided in (1) direct (primary) benefits – from businesses that sell goods and services directly to park visitors, (2) induced benefits – changes in economic activity, (3) consequential (secondary) benefits – represent impacts from the circulation of the spending within the local economy (multiplier effects), including both indirect and induced effects. [11]

On the negative side of the ledger we can find a number of problems that can be created by tourism, int. al. nature-based tourism: have difficulties of seasonality, excess demand for resources, causes inflation, can result in unbalanced economic development, degrades the nature and cultural environment, commercializes nature and

culture, rises consumer surplus or income loses that are caused by constraints connected with the use of nature resources in protected areas in the purpose of protection etc. [12], [8]

### 3.3 Economic impact of tourism, its value and indicators in national parks

After M.P. Wells (1997) theoretically, the key question in estimating the **economic impacts** of tourism to protected areas is: How much would tourism spending (and its related impacts) decline if the protected area, such as national park, in question was no longer available as a tourist destination?

In his turn the key question of economic value is: How much society, customers or visitors could pay for saving tourist destination?

Praxis shows that in researches more attention is spent to measurements of economic impact, less to economic value, however for full analysis both are important. It is explained because of difficulties in the choice of measurement indicators, differently used methodologies and subjectivity of measurement results (especially, in a sociological inquiries results). [8]

There are basic indicators for assessing economic impact of tourism are (1) visits or tourism activity (demand) – arrivals, same-days visitors, length of stay, occupancy, etc., (2) spending (demand) – expenditure and (3) multipliers (supply) – sales, income, employment, taxes, and value added. [11], [14]

The basic indicator for determining economic value of tourism is surrounding communities, consumer or visitors willingness to pay. That is usually between 10 to 90% (average 40%). [8]

### 3.4 Most often used economic impacts, calculation approaches of their value

Tourism contribution to the economy is not easy to estimate. This is mainly because diverse types of businesses selling goods and services to tourists not to constitute an easily separable economic sector. It is also difficult to isolate the economic impact of nature-based tourism, int. al. in NPs, from other types of tourism. There are different kinds of economic analysis, which are suggested by Michigan State University in the United States (US), based on Burchell and Listokin (1978), Walsh (1986), Warnell (1986), Johnson and Thomas (1992), Williams (1994), Frechtling (1994), etc., theories, which help to estimate extended impact (Extended Impact Assessment (EIA)): (1) economic impact analysis (int. al. input – output (I/O) models), (2) fiscal impact

analysis, (3) financial analysis, (4) demand analysis, (5) benefit cost analysis (B/C), (6) feasibility study and (7) environmental impact assessment. [11]

### 3.5 Economic impact estimation

Currently EIA national parks of Latvia could be connected at least with demand analysis, financial analysis and environmental Impact assessment. The circle of researchable questions in such case could be narrowed because up to this time statistics and related researches are insufficiently gathered. Like for assessing environmental impact only methodology for the Gauja water tourism is worked out (in the Gauja NP), but estimation is not done.

Calculation model of economic impact could be adapted to the example worked out in Michigan University (USA): Money Generation Model 2 (MGM2). Authors made a choice to the MGM2 because it focuses primarily on the economic impacts of park visitor spending – the direct survey. These data are a bit accessible on present statistical resources in NPs of Latvia. In such a way the basic components of economic impact analysis and calculations in MGM2 are summarized in the following equation (1):

$$(1) \text{ Economic impacts} = \text{Number of Visitors} * \text{Average spending per visitor} * \text{Economic multipliers}$$

This equation suggests three distinct steps and corresponding measurements or models:

- (1) Estimate the change in the number and types of tourists to the region;
- (2) Estimate average levels of spending (often within specific market segments) of tourists in the local area.
- (3) Apply the change in spending to a regional economic model or set of multipliers to determine the secondary effects.

MGM2 estimates both the direct and secondary effects of visitor spending and focuses mainly on the economic effects in local regions around the park. MGM2 uses primary data on tourism activity or visits (number of visits by visitors segment), spending (average spending by segment and spending category), multipliers (input-output model of the region's economy). In assessment of multipliers amount of US examples uses IMPLAN (Impact Analysis for Planning) – I/O modelling systems (indicators: quantify the sales and purchases of all the sectors producing goods and services as well as the payments and final demand in the NP's areas; total gross output and outlay; multipliers

(output, employment, income)). [15] Multipliers in territories of NPs of Latvia data are underestimate, they should be collected.

As a result of the economic impact assessment must be measured indices such as visits, spending,

### 3.6 Calculating economic value

Consumer surplus (CS) is the difference between the total amount that consumers are willing and able to pay for a good or service (indicated by the demand curve) and the total amount that they actually do pay (i.e. the market price for the product). The producer surplus is the amount that producers benefit by selling at a market price that is higher than they would be willing to sell for. There are two broad approaches to valuing willingness to pay (WTP): (1) direct and (2) indirect.

Direct approaches include the contingent valuation method (CVM) which asks people how much they are willing to pay. CVM represents the amount that park visitors (or consumers, users) would have been prepared to pay but didn't have to. In the context of nature-based tourism, it is vital to distinguish between visitors WTP to visit a park (destination) and their WTP to conserve the park (destination).

### 3.7 Model of economic benefit estimating of nature-based tourism in NPs of Latvia by modelling software STELLA

The STELLA software is created for model building and simulation on 1985. STELLA is a tool for constructing understanding about all kinds of dynamic systems from natural environments to team dynamics to economic markets and provides opportunities to explore by asking "what if," and

different and total effects (sales, jobs and income) both in NPs and in communities, int. al., in private sector. [11], [16] Total economic benefit includes both actual expenditures and consumer surplus. [8]

Indirect approaches try to elicit preferences from actual, observed market-based information. The travel – cost method has often been used to value CS in relation to parks, using expenditures incurred or travel to develop a demand curve for a recreation experience. The approach typically uses info on time and money spent by people in getting to a site as a basis for estimating WTP for a site visit. Indirect approaches with CVM and the travel cost method can measure the total value of tourism as well as CS. Determination of WTP based on visitor inquiries (questionnaire form) results.

In the result of analysis of economic values there should be clarified values of not used or future use possibility values that are important for considering economic benefit of NPs. The most valuable function of these studies has been to alert policymakers and park managers that they could, for example, identify optimal prices for park entry, thereby capturing a greater proportion of tourism's economic value and impact, as well as create self – financing mechanisms for parks. [8], [17]

watching what happens. Software has three main function blocks: (1) mapping and modeling, (2) simulation and analysis, (3) communication. [18] Basing on scientific cognitions and theories as well as possibility of economic assessment, economic benefit of nature tourism in national parks of Latvia can be stated by doing calculations according to the models created by the authors. (Fig. 1)

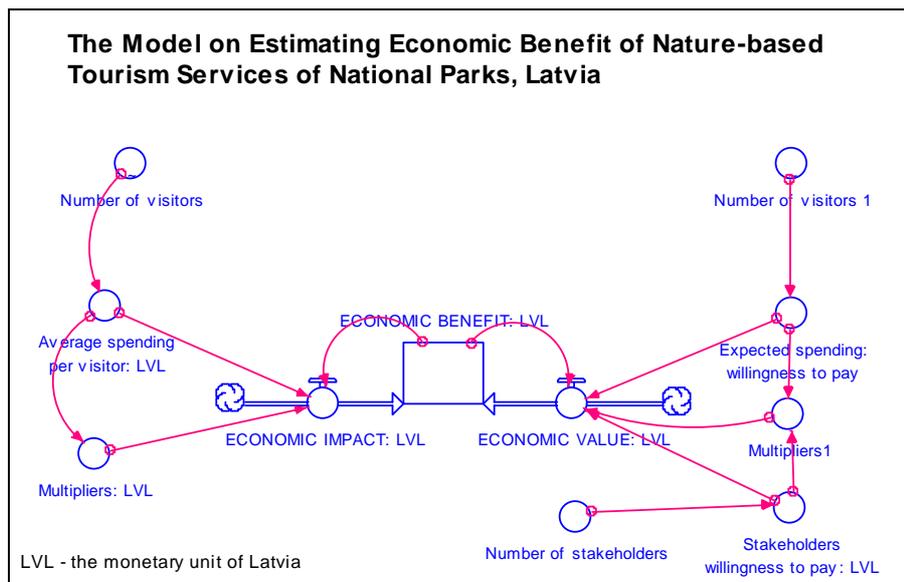


Fig. 1 The model on estimating economic benefit of nature-based tourism services of national parks, Latvia.  
Created by authors (STELLA Version 9.0.3.)

The general model on estimating economic benefits of nature-based tourism services of national parks of Latvia is created by using Mapping and Modeling possibilities. It is an icon-based graphical interface. Arrays simply represent the model structure. [18] In the centre of the model the expected or desiderated result is placed “Economic benefit” as a Stock, that is impacted by “Economic impact” and “Economic value” as an interresult Flows. In its turn Converters: number of visitors, spending, multipliers and other elements of the model or components that

make the general data flows. Connectors show mutual relations or dependence among components.

By using STELLA “Simulation and Analysis” block possibilities it is possible to model system element values and desiderated benefits/ loses as well as proportions at stated specific conditions. It is important in the processes of planning or forecasting. An example how stochastic financial data of economic benefit, impact and value are used for modelling 12 year long future process at a condition if the number of visitors, multipliers and stakeholders is constant: (Fig. 2)

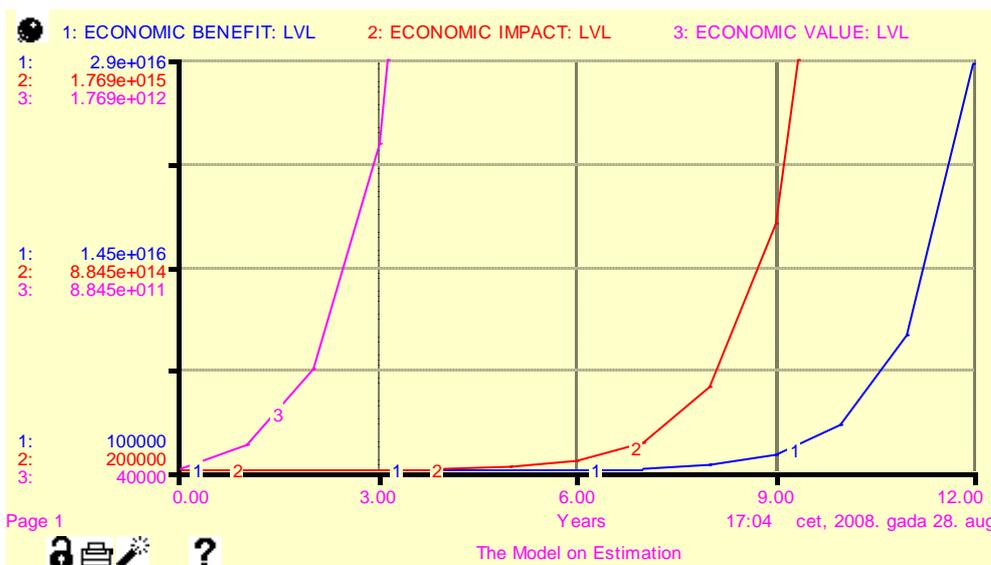


Fig. 2 The result of estimating economic benefit, impact and value (based on stochastic financial data)  
Created by authors (STELLA Version 9.0.3.)

## 4 Conclusions

Although calculating economic benefit, impact and value of tourism including nature-based tourism is complicated, there are scientific, mathematic and theoretic elaboration foreruns in the world with their help all calculations are done. Their results are used in planning economic development, nature protection and facilitating society welfare. Due to information technologies development, economic benefit calculation and modelling of nature-based tourism is flexible – possible also when development stages of national parks are different or they do not comply with leading or mainly existing tendencies in the world. All usually used analysis approaches can not be incorporated in the current economic benefit calculation model of national parks in Latvia but calculation of economic benefit however is possible. Using the model building and simulation software STELLA it is possible to forecast different changes of economic system values and results of measured participants' actions.

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