Forging the Future: Pioneering Approaches in Business, Management and Economics Engineering to Overcome Emerging Global Challenges - 2024

https://doi.org/10.24867/FUTURE-BME-2024-073 Original scientific paper

SOCIO-ECONOMIC ANALYSIS AND EVALUATION OF THE CHOSEN VARIANT FOR LAND RECLAMATION DESIGN

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Abstract

The economic analysis was conducted using an incremental approach, comparing the economic costs and benefits of the project over a 30-year analysis period, which is the same as used in the financial analysis. The analysis was carried out at constant prices using a social discount rate of 3%. The financial costs of the project were used as a basis for estimating its economic costs, by correcting the component of unskilled labor and investment and operational costs with shadow prices that take into account the level of current distortions between domestic and import-export market prices through conversion factors. The economic evaluation of the project included the calculation of the economic costs of the project as well as the assessment of the economic benefits. After presenting the total economic costs and total economic benefits, the economic cash flow is discounted and the economic parameters are calculated.The abstract should summarize the paper's contents in brief, approximately 250 words. This paper explores the consequences of working abroad in the country of emigration by comparing the sociodemographic characteristics of two waves of emigrants: those who migrated in the second half of the 20th century and those who left at the beginning of the 21st century. The analysis encompasses two spheres – the private and social realms, considering both positive and negative aspects.

Key words: land reclamation, socio-economic analysis, financial feasibility.

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1. Introduction

Over the past few decades, the complexity of financial decisions has increased significantly, thus highlighting the need to develop efficient analysis techniques for financial decision-making in different fields. Therefore, it is essential to identify methods for comparing various design assumptions to determine the one with the least impact. Land degradation is becoming a major constraint for food production and threatening future growth and development of the country. In fact, it is observed that environmental degradation is reaching irreversible levels (desertification) Reclamation of Salt-Affected Soils: Micro-Economic Issues and Policies 621 in some regions, especially in arid and semi-arid tracts. On the other hand, the replacement costs (in terms of enhanced input use, abatement and conservation costs), are mounting and would make a dent in the national income if these costs are taken into account (Reddy 2003).

Construction projects carry financial and economic risks (Xenidis & Angelides, 2005; Vaynshtok, 2017; Jiao, 2021). These risks have the potential to influence the success of projects in terms of time, cost, and quality (Perera et al., 2014). Turner (2014) points out that incomplete or inaccurate cost estimation is a high-impact risk factor in financial risk management. Managing financial and economic risks is essential to minimize project losses (Akomea-Frimpong et al, 2022). Financial and economic risks, particularly those involving land reclamation, are critical considerations in construction projects.

While the discourse on financial and economic risks in construction projects provides a global overview of the challenges in infrastructure development, the situation in Vojvodina, Serbia, presents a unique case study that illustrates these challenges on a micro scale. In Vojvodina, the combination of environmental threats, such as frequent flooding, and the existing aging infrastructure for land reclamation exemplifies the critical need for a nuanced approach to financial risk management tailored to local conditions. The region's reliance on an extensive network of pumping stations for agricultural productivity, which is now in dire need of modernization, underscores the importance of accurately estimating costs and managing financial risk. This is particularly pressing, as the region seeks to balance technological upgrades with sustainable agricultural practices. Thus, the general principles of financial risk management in construction projects find a specific and urgent application in the context of Vojvodina's land reclamation efforts, highlighting the need for a comprehensive multicriteria financial analysis.

In Vojvodina, approximately 50% of the area has been historically threatened by floods from rivers flowing through this region, internal waters, and high groundwater levels. Through the regulation of river courses, flood defenses, and drainage, these areas have been transformed into fertile fields. As of 2005, 92% of Vojvodina’s territory could be utilized for agricultural purposes (Xenidis & Angelides, 2005). However, such systems require continuous maintenance and modernization, making financial analysis a pivotal factor in assessing the feasibility of these projects. Previous studies have highlighted the importance of financial risk

management in the construction sector, with incomplete or inaccurate cost estimations being identified as significant risk factors.

Given the increasing complexity of financial decisions, this study presents a multicriteria analysis to assess the financial feasibility of various design options for land reclamation in AP Vojvodina, Serbia. This analysis, based on data from 104 pumping stations, aimed to determine the optimal design variant by evaluating both economic and technical criteria. The optimal functioning of pumping stations is necessary for the effective protection of agricultural and urban areas within land reclamation systems, whose water regimes are managed by the aforementioned pumping stations.

The pumping stations that were the subjects of the study were located in a relatively wide area; therefore, the analysis of their condition and operation was carried out according to their affiliation with the land reclamation system.

Most pumping stations are technologically obsolete and problematic for maintenance, and as such, require the replacement of old parts and equipment. Today, in light of climate change and adaptation measures, the need for energy saving, increased energy efficiency, and environmental protection, it is necessary to reconstruct and modernize the existing facilities and equipment of pumping stations.

Economic profitability analysis deals with the question of the extent to which the project is valuable to society. It is worth investing in a project if its economic benefit, for a given area, is greater than the expected benefit of other alternative solutions.

The purpose of the economic evaluation is to determine the viability of the project in terms of its value to society, not from a financial aspect. The national government invests its limited resources to contribute to the improvement of the living standards of the people of the country. Government resources include taxes collected by the people and distributed by the Government to activities or projects for the benefit of the nation. State investments, therefore, must be efficient, effective and valid.

The main objective of the economic analysis is to assess the contribution of the proposed project to future improvements in social and economic well-being compared to resource costs. Thus, economic analysis deals with the question of whether the benefits of the project exceed the costs of the project.

Economic analysis is a systematic approach to determining the optimal use of scarce resources in achieving a specific goal within certain assumptions and constraints. The analysis takes into account the opportunity costs of the resources used and attempts to measure in monetary terms the private and social costs and benefits of the project to the community.

2. The economic flow of the project

The cumulative discounted economic flow of the project becomes positive in the tenth year, while the Economic Net Present Value (ENPV) for the life of the project of 30 years is € 324.973.641.

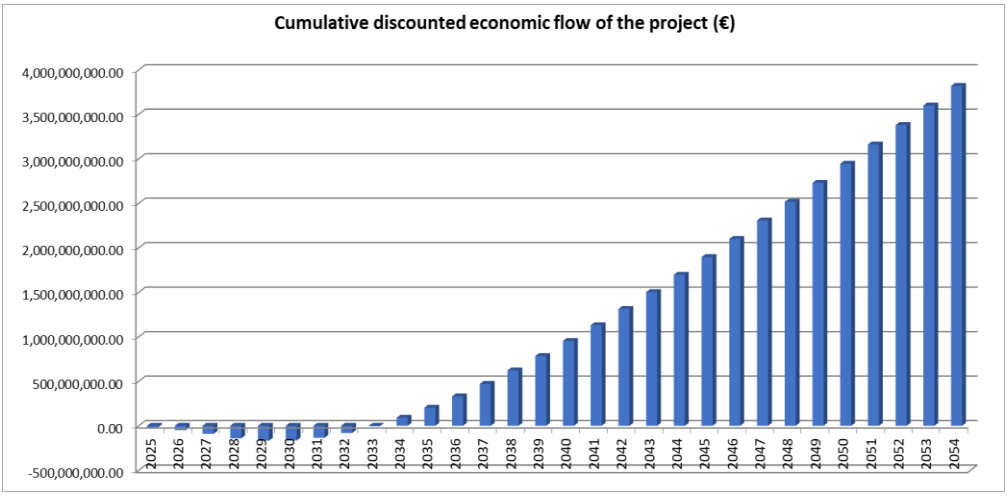

Figure 1: Cumulative discounted economic flow of the project (€)

3. Economic cost-benefit analysis

Economic profitability analysis deals with the question of the extent to which the project is valuable to society. It is worth investing in a project if its economic benefit, for a given area, is greater than the expected benefit of other alternative solutions.

The purpose of the economic evaluation is to determine the viability of the project in terms of its value to society, not from a financial aspect.

In the case of imported products and services, there is no conversion because it is assumed that the international market is more liberalized than the domestic one. A standard conversion factor that measures the average difference between domestic and world prices is applied to other prices (Table 1).

Table 1: Calculation of the standard conversion factor

M	Import 2021	25.697.100.000	€
H	Export 2021	19.627.500.000	€
TM	Customs 2021	502.127.660	€
SCF=(M+H)/(M+H+TM)		**0,989**	

Since no special wage distortions are foreseen for employees belonging to the 'qualified' categories, the standard conversion factor is applied.

With an unemployment rate of 9.1%, contributions of 35.1%, the participation of unskilled labor of 50%, and the participation of labor costs of 50% in investments and 17.1% in operating costs, the stated financial costs of the project will be corrected for the shadow labor cost, i.e. applying a coefficient in the amount of 95.4% for investments, i.e. 96.8% for operating costs.

Table 2. Calculation of correction factors CAPEX and OPEX

Discount rate	3,0%
Regional unemployment rate (SN)	9,1%
Taxes and contributions on earnings (PD)	35,1%
Shadow wage rate factor, unskilled labor SNRS = (1-SN)*(1-PD)	59,0%
Participation of unskilled labor UNRS	50,0%
Total, earnings in shadow SOP = (1-UNRS)+(UNRS*SNRS)	79,5%
Share of labor costs in CAPEX, RSI	17,1%
Participation of labor costs in OPEX, RSOT	10,1%
CAPEX cost factor, FKI=1-RSI*(1-SOP)	96,5%
Cost factor OPEX, FKOT=1-RSOT*(1-SOP)	97,9%
Correction factor CAPEX, FKI*SCF	95,4%
Correction factor OPEX, FKOT*SCF	96,8%
Discount rate	0,989

Links:

Unemployment rate	https://www.stat.gov.rs/sr-latn/oblasti/trziste-rada/anketa-o-radnoj-snazi/
Taxes and contributions on wages	https://porezionline.rs/statistika.php?cID=889

4. Socio-economic assessment of profitability and efficiency

The economic analysis is performed from the point of view of the whole society and its goal is to assess the impact of the project on the well-being of the population and the community.

Economic analysis is performed on the basis of information obtained from financial analysis. Furthermore, in order to move from the perspective of the project owner to the perspective of the whole society, three main updates of the financial flows are made:

1. Introduction of externalities,
2. Fiscal corrections,
3. Conversion from market to calculation prices.

The results of the socio-economic analysis are shown in Table 34.

Table 3. Profitability results of economic and social analysis

Parameter	Economic internal rate of return (EIRR)	Economic net present value (ENPV) €	Discounted payback period (years)	B/C Analysis
Results of economic analysis	31%	324.973.641	7	2,69

3. Conclusion

Summary evaluation of the validity of the investment and The financial and economic analysis was carried out in accordance with the Law on the Construction, the Rulebook on the Scope and Content of the Justification Study and the Feasibility Study, with the simultaneous use of recommendations and methodology in accordance with the European Commission's Guide to Cost-Benefit Analysis of Investment Projects Economic appraisal tool for Cohesion policy 2014-2020.

The economic-financial analysis should show whether the project and its implementation are justified from a social-macro aspect and a financial-micro aspect. The data used refer to the prices of works and equipment based on technical solutions from the project.

A detailed economic and financial analysis was conducted, and it covered all aspects of the profitability, efficiency and financial feasibility of the Project.

Acknowledgments

This research is supported by the Provincial Secretariat for Higher Education and Scientific Research of the Autonomous Province of Vojvodina, according to the Contract no. 000872071202409418003000000000104004 through the project led by the Faculty of Technical Sciences in Novi Sad, "Analysis of the Impact of ESG Criteria on the Legal and Economic Aspects of Sustainable Development in Corporate Governance."

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