



## ASSESSMENT OF THE STRUCTURE OF THE IMPLEMENTED PROJECTS OF SERICULTURE AND SIDE SILK INDUSTRIES IN THE GUILAN PROVINCE- IRAN

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### ABSTRACT

Allocation of resources is one of the principal concepts in economics and assessment of is the most important index of optimal allocation. Considering shortage production agents and the necessity for optimal use of these agents, assessment comes into play as a key basis of development projects with its great role in extensian and development of projects especially in developing countries. Decision-making based of the gains of plans in relation with the performed costs constitutes the basis of the economic assessment of a project. Therefore, in every producing area, conductance of financial and economic estimations is crucial in order to investigate, justify, and prioritize different activities. The sericulture development and side silk industries projects were established in the Shaft town, of Guilan Province by the Corporation of Sericulture of Guilan Province in 2013. These projects include 4 plans (Cultivation of modified mulberry seedling, Construction of sericulture site, Construction of silk-pulling site, Weaving silk texture and local clothes). This research has dealt with the assessment of the mentioned plans. The aim of this investigation is to evaluate the extendibility plans of sericulture and spindling workshops through assessment indexes including the Payback Period, Payback Period Reverse, Accounting Rate of Return, Net Present Value, Internal Rate of Return, The Benefits to cost ratio and The profitability Index. The obtained results indicated that all of the three considered scenarios (development of a silkworm rearing site, development of a spindling workshop, and development of both sites) were economically justifiable.

**Keywords:** sericulture, development, silk industries, financial indicators.

### INTRODUCTION

The sustainability of every village is continent upon its dynamicity and economic sustainability. The main reason behind evacuation and abandonment of many Iranian villages is their economic incompetency and deficiency (Motiye Langroodi, 2002). The spatial variety of Iranian villages has resulted for various economic productivities. Such that in some rural area in Iran, economic activities are developed in various levels with certain characteristics. Despite There are wider range of rural economics in comparison with agricultural economics and although there are some individuals busy non-agricultural activities in the most villages and make ends meet through non-agricultural, the agricultural structure of every village represents the major economic framework of that village (Jomeh Pour, 2012).

Due to seasonality of agricultural activities in counties such as Iran, application and exploitation from the entire available work force during the year is not practically possible and even part of the active and competent labor force remain unused. Development of urbanization and the trend of emigration to cities, confront villages with shortage of human resources required for agricultural activities. This point is relgd to stop farming activities in the many villages and shortage of agricultural productions including foods and raw materials of industries, etc. Side agricultural activities including processing industries and handicrafts are of high significance since they create employment and provide the

economic incentives required for rustication and prevention from emigration.

### Speech problems

Optimal allocation of resources is a key concept in economics. Accordingly, economic assessments of plans are among the investigation priorities regarding optimal allocation of resources. This assessment can have an important role in promotion and development of such plans especially in developing countries. Decision making based on the gains of plans in comparison with the realized costs constitutes the basis of economic assessment of plans. Considering shortage of production agents and the necessity for optimal usage of these agents, assessment comes into play as one of the main principles of development plans. Therefore, in every production area, conductance of financial and economic estimations for evaluation, justification, and prioritization is essential (Rezai, 2007).

Sericulture is one of the subsections of agriculture dealing with production of cocoons as a valuable global product alongside of establishing relationships with other sections. Sericulture and related industries create different levels of rural and urban employment between production of the cocoon and preparation of final products bringing about significantly increased number of job opportunities (Fund for the development of sericulture, 1990). Ever-growing consumption of silk textures, novel application of silk in different industries, and use of silk in handicraft and carpet



weaving can guarantee the economic efficiency of this production activity to the benefit of rural small and deprived producers (Rabino, 1993). Among side rural activities, sericulture is the most employment generating activity and if we calculate the employment obtained from converting raw silk to silk products such as carpet, texture, and shirts, a general employment and major job opportunities would be created related to sericulture (Shbyryan, 1994).

Sericulture plays an important role in application of rural resources in the best way possible in implementation of socioeconomic activities, people's subsistence, employment, and income generation (Malik *et al.*, 2008). In addition, sericulture is possible to be carried out concurrent with other agricultural activities and thus one can well employ labor force and other resources. In addition, the side products of silk production are also usable in other agricultural activities.

In a study conducted by (Kakoti, 2012) entitled "sericulture as a source of employment and income in Asam, India", he concluded that sericulture has become an opportunity to earn extra income and create sustainable employment in the rural sector and decrease emigration to urban areas.

The results of a study (Dewangan, 2013) entitled "subsistence opportunities through sericulture in the Indian Garguda tribe" revealed that sericulture had resulted in increased saving for the people, decreased seasonal emigration, and improved quality of life in the villagers and families of the studied tribe.

In another research (Kasi, 2013) called "the role of women in sericulture and development of society in the Southern India", sericulture has been an important tool in creation of employment, improvement income, and one of the most appropriate household activity with participation of women.

The projects of sericulture and side silk industries have been implemented by the sericulture organization as a profitable and developmental side activity in the Shaft City, Guilan Province in 2013. These projects included the plans of cultivation of modified mulberry seedlings, construction of sericulture site, construction of silk-pulling workshop, and weaving silk texture and local clothes.

In these projects, the sum of facilities required for implementation of each of the aforementioned plans is as follows:

The row	Plan	The sum of facilities \$
1	Cultivation of modified mulberry seedling	329
2	Construction of sericulture site	300
3	Construction of silk-pulling site	260
4	Weaving silk texture and local clothes	400
Sum		1289

In these plans, every hectare of the Shaft region lands is allocated to cultivating modified mulberry tree. They could be cultivated either in combination or in the margin of the mentioned lands. Considering the pattern of cultivation of 600 mulberry seedlings in every hectare, sufficient for rearing silk worm as many as three boxes, this assessment deals with economical justification of sericulture site as the first scenario, construction of spinning workshop as the second scenario, and construction of both workshops alongside each other.

## RESEARCH METHODOLOGY

In the present research, the methods used in the assessment of agricultural plans, common and standard methods well recognized and applicable in economics literature and financial-economic assessment have been employed.

### a) Payback Period (PP)

It is the time period required for the cash flow to cover the main costs of the plan investment. The shorter the payback period and have the lowest index them on different kinds, the larger the sufficient liquidity of the assets (Alvani *et al.*, 2008).

$$I = \sum_{t=0}^p F_t \quad (1)$$

Where, I is the total investment cost, P is the period of return on investment, F is the annual net profit of the plan, and t is the year of interest. Based on this method, the plan would be accepted for implementation when  $p \leq p_m$ , where  $p_m$  is the time of acceptable return period according to the decision-maker or the investor.

### b) Payback Period Reverse (PPR)

The payback period Reverse on investment period is also a representative of the average return rate of the initial capital. The plans with a larger reversed return on investment period are more suitable (Shaukat Fadaei *et al.*, 2010).

$$PPR = \frac{1}{PP} \quad (2)$$

### c) Accounting Rate of Return (ARR)

The Accounting Rate of Return is calculated as a portion of the profit generated from an investment plan against the output of a utilized capital. If ARR is equal to or larger than the desired efficiency rate, the plan is acceptable (Jaafary Camimy, 1996).

### d) Net Present Value (NPV)

The Net Present Value is, indeed, the difference between the current value of the gains of the project and the current value of the plan costs. Therefore, for calculation of the current value, a discount rate is required. If the current value of the plant is positive and there is no limitation on the budget, then the plan is acceptable and vice versa. When current net value is zero, this plan does not have any superiority for implementation and thus the



person would be indifferent to such plans. When only one plan is implementable, a plan is chosen based on this criterion with the highest Net Present Value (Shaukat Fadai *et al.*, 2010).

This index is calculated according to the following formula:

$$NPV = NCF_0 + (NCF_1 \cdot a_1) + (NCF_2 \cdot a_2) + \dots + (NCF_n \cdot a_n) \quad (3)$$

$$NPV = \sum_{t=0}^n (B - C)t \cdot \alpha_t \quad (4)$$

$$\alpha_t = \frac{1}{(1+r)^t} \quad (5)$$

$$(NPV = \sum_{t=0}^n \frac{(B-C)_t}{(1+r)^t} \quad (6)$$

Where,  $\sum$  is the sum of the plan life years from the year zero up until  $n$ ;  $B_t$  and  $C_t$  are the profits and costs of the plan in the year  $t$ , respectively.

**e) Internal Rate of Return (IRR)**

The internal rate of return of the capital is the discount rate at which the net present value of the plan is equal to zero. In other words:

$$\sum_{t=0}^n (B - C)_t \cdot \alpha_t = 0 \quad (7)$$

According to this criterion, the investors usually define a minimum expectable rate of return for themselves. The investor runs the plan when the internal rate of return of the capital is larger than the interest rate in the market (Gondalia and Patel 2007).

**f) The Benefits to Cost Ratio (BCR)**

Based on this method, if the benefits to cost ratio is larger than or equal to one, then the plan is

economically justifiable; otherwise, the plan is not economical (Guli Masoudi, 2009).

$$BCR = \frac{\sum_{t=1}^n \frac{B_t}{(1+i)^t}}{\sum_{t=1}^n \frac{C_t}{(1+i)^t}} \quad (8)$$

**g) The Profitability Index (PI)**

Only when the initial capital is equal, a plan with a larger Net Present Value is more preferable. Therefore, if the initial capital is not the same, for modification of the NPV, profitability index should be used. If the profitability index is larger than one then the plan is acceptable and vice versa. If the profitability index were equal to one, acceptance or rejection of the plan would not make difference (Jomhepor, 2012).

$$PI = \frac{\sum_{t=1}^n \frac{CF}{(1+i)^t}}{ICO} \quad (9)$$

**Analysis**

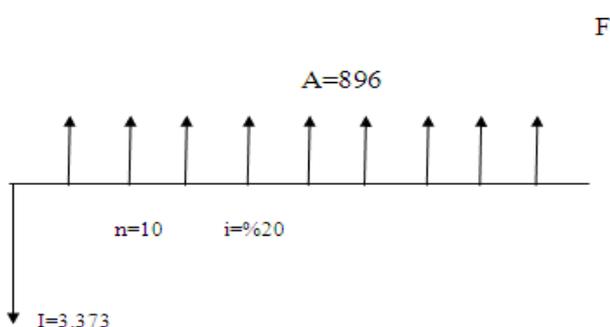
This assessment is adapted from a sericulture development project as many as three boxes in Shaft City. It includes the plans of cultivation of modified mulberry seedlings, construction of sericulture site, construction of silk-pulling site, and weaving silk texture and clothes. According to the scenarios of the mentioned projects and the fact that modified seedling after three years to be harvestable, only the plan scenarios, construction of sericulture site, and construction of silk-pulling site have been evaluated.

- assessment of the construction plan of sericulture site:

Based on the information provided in Table-1, for construction of the mentioned site with an area of 60 m<sup>2</sup>, 3.373 thousand Dollars were spent.

**Table-1.** The construction plan of sericulture site.

Investment (\$Th)	Current costs (\$Th)	The total sale (\$Th)	The cash flow (\$Th)	The interest rate	The project lifetime
3.373	1.328	222	896	%20	10



**Figure-1.** The diagram of the cash flows for the plan of constructing sericulture site.

- F I = The initial investment of the plan
- A = The cash flow of the plan
- F = The future value of the cash flow
- i = The interest rate
- n = The number of years assessment

**Table-2.** The financial and economic index calculated for construction of the sericulture site.

P <sub>B</sub> P	PPR	IRR	BCR	ARR	NPV	PI
3	0.33	%23	1.11	%27.6	382	1.11



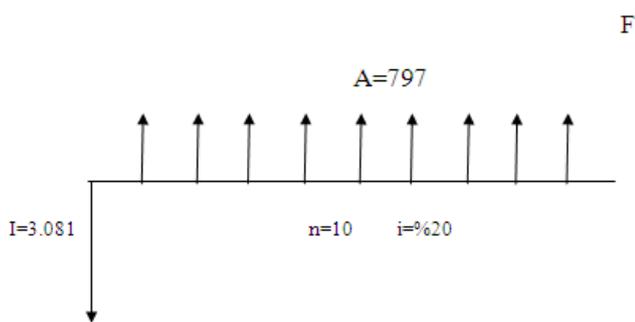
The results of evaluation of sericulture site construction indicated that the return on investment period is three years for the plan executive. The net present value of the plan is equal to 11599494, where its positivity is indicative of higher income than costs and thus economic justifiability of the plan. The plan internal rate of return is also larger than the capital cost rate.

- assessment of the silk-pulling workshop establishment plan

According to the information provided in Table-3, the cost of construction of spinning workshop plan with an area of 24 m<sup>2</sup> is 3.081 thousand Dollar.

**Table-3.** Pulling workshop establishment.

Investment (\$ Th)	Current costs (\$ Th)	The total sale (\$ Th)	The cash flow (\$ Th)	The interest rate	The project lifetime
3.081	16.993	17.791	797	%20	10



**Figure-2.** The diagram of the cash flows for the pulling workshop establishment.

- I= The initial investment of the plan
- A= The cash flow of the plan
- F= The future value of the cash flow
- i= The interest rate
- n= The number of years

**Table-4.** The financial and economic indexes calculated for pulling workshop establishment.

P <sub>B</sub> P	PPR	IRR	BCR	ARR	NPV	PI
2.2	0.45	%22	1.8	%40.9	262	1.08

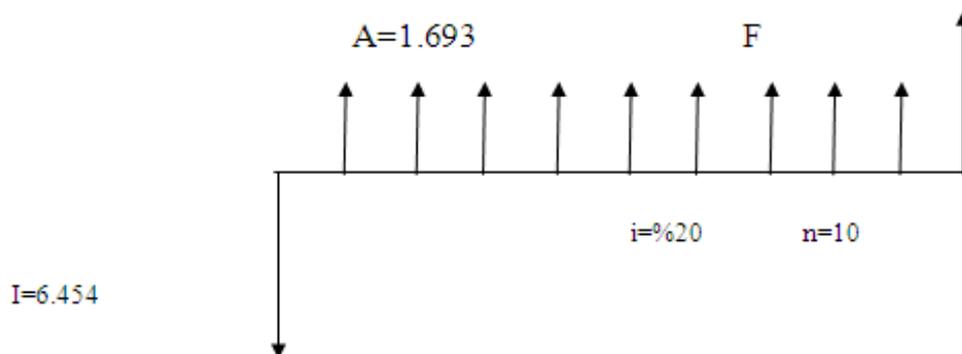
The assessment results of the plan on establishing spinning workshop revealed that it has a return on investment period of two years. Its current value index is positive, and the internal rate of return and the benefits to cost ratio, and the profitability index for the justifiability and profitability of this plan. Therefore, the second scenario, i.e. construction of spinning workshop is acceptable.

- Assessment of the sericulture projects and spinning workshops together

Based on the information given in Table-5, the cost of constructing a sericulture site and a spinning workshop with an area of 84 m<sup>2</sup> was 655 thousand Dollar.

**Table-5.** Construction of the sericulture and spinning workshop.

Investment (\$ Th)	Current costs (\$ Th)	The total sale (\$ Th)	The cash flow (\$ Th)	The interest rate	The project lifetime
6.454	18.343	18.013	1.693	%20	10



**Figure-3.** The diagram of the cash flows for the plan of constructing sericulture site and pulling workshop establishment.



I= The initial investment of the plan  
 A= The cash flow of the plan  
 F= The future value of the cash flow  
 I= The interest rate  
 n = The number of years

The results obtained from the assessment of the plan of the sericulture site construction and pulling workshop establishment are summarized in Table 6 according to the mentioned indices.

**Table-6.** The financial and economic indexes calculated for construction of the sericulture site and pulling workshop establishment.

P <sub>B</sub> P	PPR	IRR	BCR	ARR	NPV	PI
3.2	0.31	%20	1	%25.7	145	1.099

The assessment results of plans of constructing sericulture site and spindling workshop demonstrated that these plans together have a return on investment period of 38 months. The net present value of these plans is positive together, and other calculated indexes also confirm the profitability and economic justifiability.

## RESULTS AND DISCUSSIONS

Through assessment of the projects of sericulture development and side silk industries, the first scenario of constructing a sericulture site, it was observed that the net present value of this scenario has been positive, its internal rate of return has been larger than the rate of capital cost, and finally it was profitable in terms of profitability and benefits to cost indexes. The first scenario, construction of a sericulture site, where the return on investment period has been three years based on the assessment, is economically justifiable. Therefore, it is recommended that with financial and technical supports of the government, in line with offering low-interest loans and the procedure of running modern sericulture sites in conjunction with partnership of sericulturists, the required planning and measures be taken.

Considering the second scenario, the plan of constructing a spindling workshop, the evaluation indicated that its net present value has been positive, and the index of the internal rate of return, benefits to cost, and profitability confirm the justifiability of the plan. Therefore, considering the fact that return on investment period for constructing a spindling workshop is two years, it is recommended that in industries related to this workshop, measures regarding financial and technical supports of constructing a small spindling workshop be taken in regions where sericulture is practiced.

Considering the third scenario, related to combining the two plans, the evaluation indicated that their net present value has been positive and are economically justifiable according to other index. Therefore, this scenario can also play a role in development of sericulture. Establishment of sericulture site along with spindling workshops is recommended,

since it can be effective in development of this industry with financial supports of the government and partnership of sericulturists.

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