An Economical Study of Brutia pine (Pinusbrutia) Plantings Utilized in Aforestation, Latakia, Syria

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Abstract

The study was performed in Latakia governorate (Al Hanadi Nursery) , Syria. The research purposed to survey the costs of planting Brutia pine (Pinusbrutia) utilized in afforesting some fire-damaged forest sites in Latakia governorate, working on analyzing those costs and optimally calculating their economic returns.

Descriptive analytical method was adopted in data computation, assessment, and interpretation to arrive at beneficial scientific results.

The study showed that gross product equals 1710000 SP. /dunum, whereas total productive costs amounted to 1151780.9 SP./dunum, and profit per dunum reached 558219 SP./dunum. These results are beneficial for the appropriate planning of a better and more accurate artificial afforestation process.

Key words - *Brutia pine (Pinusbrutia), total margin, profit.*

I. INTRODUCTION

Forests cover circa 30% of the earth surface area, and are deemed a storage for about 45% of carbon in earth. The studies have demonstrated a close correlation between forests and global climate (Malmsheimer et al., 2011).

Brutia pine forests are considered among the basic environmental systems in East Mediterranean in general and in Syria in particular, which are regarded an example of multifunctional forests, since they perform diverse environmental, economic and esthetic functions (Al Kanj& Ali, 2017).

The area naturally occupied by Brutia pine in Syria about 50 thousand hectares, most of which in Al Bayer and Al Bassit Mountains . These forests are closely connected with human life through providing a timber source for various uses, contributing to maintaining soil and water , and securing a resort for recreation and rest (Ali, 2017).

A great change in forests has been observed in recent years owing to destructive human interventions , like agricultural expansion at the expense of forests, overgrazing, chopping, fires, pollution, and using chemical pesticides , which may lead to devastating environmental sanctuaries , the matter which endangers the existence and development of living organisms (Losey&Jurina, 2003).

Despite man's resorting to many afforestation projects; most of these projects had not been studied in a scientific precise way, in spite of the great impacts in newly afforested forests (Rajab 2014).

In many countries of the world, forests constitute an important national economy source, for their contribution to the availability of hard labor on the one hand, and finding job opportunities, stable living in rural areas, and limiting immigration andurban migration, and utilizing them scientifically, on the other hand, lead to minimizing unemployment levels (Bayoumi, 1996).

Artificial afforestation represents all works and measures taken by man to arrive directly at economic targets (productive afforestation), and indirectly to achieve preventive environmental objectives (preventive afforestation) (Supreme Committee for Afforestation, 2000).

II. RESEARCH PROBLEM

Syria is considered among the forests-poor countries ,where its area comprises only 2.71% of the country's area (Nahhal,2005) , and despite the limited importance of its timber production, since they are regarded as preventive rather than productive forests; forests in Syria play a significant role in preserving environmental balance , improving local climate, maintaining soil and water, protecting biodiversity , mitigating floods severity and pollution of lakes and rivers, and protecting farming lands at the foot of mountainous slopes, as well as being considered an import source for tourism and recreation.

Statistics have demonstrated that about 60% of forests area in Syria greatly deteriorated due to fires,

overgrazing, and forest chopping for farming and urban expansion, i.e. deterioration of forests and decrease of their area in Syria is attributable to natural and demographic factors, however, fires constitute the main threat to forests in the country, particularly Brutia and Aleppo pine forests centered in the coastal mountains.

Forest fires in Syria lead to severely dangerous consequences on natural resources, environmental systems and preventive functions. Mitigating fire consequences in terms of agricultural , economic and social sides, and facilitating returning to natural status as far as possible through making artificial afforestation projects , but the majority of these projects have not been studied and implemented in an accurate economic and scientific way, whence the significance of this research in understanding and surveying the re-afforestation's role and its economic and social effects on natural resources with their reflections in the national economy, and providing means of living to the population communities in the regions on forest boundaries in Latakia governorate.

III. RESEARCH'S SIGNIFICANCE AND OBJECTIVES

The research derives its significance from two important aspects:

The first: its achieving the most important objective of the strategy and policy of future development in Syria, represented by optimal utilization of natural resources, protecting them from deterioration and exhaustion, securing their sustainability, and rehabilitating deteriorated and exhausted ones, where forests are considered among the most important of these natural resources in Syria , as an important national natural resource, which provides a miscellaneous group of benefits on the environmental, economic and social levels.

The second: laying out, surveying and implementing artificial afforestation program based on scientific economic foundations for the fire affected forest regions in Latakia governorate, making use of constructive scientific evaluation of previously executed afforestation projects.

In view of the apparent gradual increase of climatic aridity, and multiplicity of natural or deliberate forest fires in the Syrian Arab Republic in general, and Latakia governorate in particular, it has been found so important preparing this study, aspiring to realize the following objectives:

1- Studying costs of producing Brutia pine seedlings used in afforestation process of some fire-affected forest sites in Latakia governorate.

2- Analyzing costs of producing Brutia pine seedlings and optimally calculating their economic returns .

IV. RESEARCH MATERIALS AND METHODOLOGY

A. Research Methodology:

To accomplish this research in the appropriate scientific form, the descriptive analytical method will be adopted in studying costs of producing Brutia pine seedlings used in the afforestation process of some fire-damaged forest sites in Latakia governorate, then to analyze, evaluate and interpret the results to arrive at beneficial scientific results.

B. Community and Sample of the Research:

In 2007, forest fires in Latakia governorate totaled (15) , with a damaged area of (2700) hectares, whereas in 2012, it totaled (257) fire with damaged area reaching up to (10000) hectares. In 2016, on the other hand, it amounted to (256) fires with a damaged area of (11000) hectares. Table (1) shows number of fires and their area in Latakia governorate.

Table (1) Number and area of fires inLatakiagovernorate.

Year	No. of Forest Fires	Area/hectares	No. of Agricultural fires
2007	150	2700	187
2008	100	42.3	178
2009	87	19.7	212
2010	105	36.6	385
2011	51	8,9	93
2012	257	10000	166
2013	146	292,8	468
2014	132	158,8	685
2015	144	99,8	728
2016	256	11000	1050

Source: Ministry of Agriculture and Agricultural Reform in Syria, 2017.

C. Survey Location

The study was performed in Al Hanadi Forest Nursery affiliated to the Directorate of Agriculture and Agricultural reform in Latakia, where the nursery is considered specialized in forest seedlings production. The survey site covered 10 dunums of nursery area allocated for producing 240000 (PinusBrutia) to be lately used in the process of afforesting damaged forest sites.

D. Productive Costs Indexes

Productive cost is considered the appropriate form to measure production expenses per similar productivity measurement units. It is an expression of part of the value including the material expenses spent on production, and value of the product necessary for labor force reproduction. Hereunder are the most important production costs criteria:

1. Total Production Costs:

Calculated via the relation: C.pf = Σ(Mf + Wf + Rf +If)

Where : C.pf = Total Production Costs.

Mf = Total Production Costs

Mf= Material Expenses

Wf = Wage Expenses (Live effort costs)

Rf = Land Revenue

If = Capital interest. (**Khaddam, Jahjah, 2013)**

2. Capital Interest:

Calculated from the following relation:

Capital Interest = { (Primary Costs + Land Revenue) x 10 } ÷ 100 , where banking profit rate is 10%.

3. Farm Income Indexes

a) Profit per dunum = Gross Product – Total Costs (with capital interest).

b) Total Margin: Total Margin = Gross Product Value – Variable costs.

(Khaddam, 2011).

4. Economic Efficiency Indexes

- **Profitability Coefficient**: This index measures profit rate relative to investments ,or production costs, as follows:

a) Profitability coefficient relative to invested capital: $E_{B.CL}$ = (B ÷ C.L). 100

Where $E_{B.CL}$: Profitability coefficient in proportion to invested capital (%),

B: is Total attained profit.

CL: Invested capital.

b) Profitability Coefficient in proportion to Primary Production Costs:

$E_{m.L}$=B ÷(MC+ LC)×100

Where Em.L = Profitability Coefficient in proportion to Production Costs

MC.= Material Costs.

LC= Labor Wage Expenses. **(Al Uleiwi, Abdullatif, 2012)**

V. RESULTS AND DISCUSSION

A. Agricultural Processes Required for Brutia Pine Production

For Brutia Pine production of a 1-hectare area, total production costs have to be calculated, including land preparation costs, sowing the seeds, nitrogen fertilization, control and weeding.

Table (2) shows that total Production Costs amounted to 10239700 SP. , where sacs pre preparation costs and seed planting totaled 2904000 SP./hectare at a percentage of (28.37%), and Nitrogen fertilizing cost amounted to 7208000 SP./hectare at a percentage of (70.4%) , knowing that prices, costs and wages were adopted at the time they were spent, i.e. starting from the time when land was prepared and made ready for farming through production and marketing, which is in conformity with that found in (FAO,2014) report, that fertilization costs were the highest.

Table 2: Primary Production Costs of all agricultural processes required for the production of Brutia Pine/ SP.

Agricultural Processes	Expenditure Value (SP./ 1Hectare)	Percentage (%)
Preparing land for cultivation	52000	0.5
Sacs preparation and sowing of seeds	2904000	28.37
Nitrogen fertilization	7208000	70.4
Lesions Control	10000	0.097
Irrigation	8000	0.079
Total Primary Production Costs	57790	0.56

Source: Field investigation Data.

B. Production Costs of Brutia Pine Seedlings Production

On the whole, total Production Costs are both fixed costs and variable costs. In this study, as shown in Table (3), variable costs totaled a value of (10239790) SP./ hectare at a percentage of (88.91%) of total production costs , whereas fixed costs totaled the value of (12780190) SP./ hectare at a percentage of (11.09%). Concerning fixed costs, capital interest was the highest (1041979)SP./hectare, while in variable costs, farm necessities value was the highest at a value of (9578040) SP//hectare, which is congruent with that found by (Irene et al. , 2009 &Mangaoang et al., 2005).

Agricultural possessions in developing countries are regarded the obstacle to broadening seedling production, where capital interest is large. Sustainability concept is closely related to providing the agricultural necessities , which occupy the largest percentage of costs, as illustrated in the study.

Table (3) Total production Costs of Brutia Pine Seedlings Production (SP.)

Description	Value (SP./hectare)	Percentage (%)
Variable Costs		
Total Value of Agricultural Processes Wages	661750	5.76
Total Value of Agricultural Necessities	9578040	83.15
Total variable Costs	**10239790**	88.91
Fixed Costs		

Land Lease	180000	1.56
Capital Interest	1041979	9.04
Depreciation	56040	0.48
Total Fixed Costs	**12780190**	11.09
Total Production Costs	**11517809**	100

Source: Field Investigation Data.

C. Economic Analysis of Brutia Pine Seedlings Production

Following dependence on data of tables 2 and 3, various economic indexes for Brutia Pine production were calculated, where gross product reached 17100000 SP. / hectare, whereas total production costs amounted to 11517809 SP./hectare . The rise is attributed to increasing costs of agricultural processes, and the rise in the prices of farm necessities required for seedlings production.

Regarding profitability coefficient, it reached 48.46% in proportion to invested capital. It is a good indicator in the domain of agricultural investment, meaning that each 100 Syrian pounds paid in production returns a profit of 54.51% .

Total economic efficiency totaled 1.48, i.e. each 100 SP. Spent as production costs achieves a profit of 48 SP. , which is demonstrated by Table (4).

Table (4) Economic Indexes of Brutia Pine Seedling Production

#	Description	Unit/Hectare
1	Gross Product	17100000
2	Total Production Costs	11517809
3	Total Margin	6860210
4	Profit	5582191
5	Profitability Coefficient in Proportion to Invested Capital	%48.46
6	Profitability Coefficient in Proportion to Production Costs	%54.51
7	Overall Economic Efficiency	1.48

Source: Field investigation Data.

VI. CONCLUSIONS AND RECOMMENDATIONS

First- Conclusions

1. Pine seedlings production costs have been found to achieve net profit of (558219.1) SP./dunum/yr., where total costs per dunum totaled (11517809) SP./dunum/yr. The rise in these costs is due to the increase in the cost of service processes and irrigation process.
2. During surveying economic analysis indicators for Brutia Pine seedlings production per dunum, it has been observed what follows:
   - Gross product reached circa 1710000.
   - Total margin reached circa 686021 SP.
   - Profit per dunum amounted to about 558219.1 SP.

Secondly- Recommendations

1. Working to encourage and expand conifers in general, and Brutia, in particular, for the economic importance it achieves and good economic gain it attains.
2. Working to lower sacs preparation and seed planting costs via trying to lower production costs price.

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