

## Economic Analysis of Greenhouse Cultivation of Tomatoes and Cucumber Vegetables in Neyshabur, Iran

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(Received: 10 January 2015; accepted: 09 February 2015)

If we want to produce out of season, we must use the methods to control plant development environment such as temperature, relative humidity and light, for this purpose we use the greenhouse. In the present study economic analysis of greenhouse cultivation of tomatoes and cucumber vegetables was investigated. Three benefit of the cost (B/C), internal rate of return (IRR) and interest's current worth (NPV) were used to evaluate economic greenhouse cultivation of these products in Neyshabur, Iran. Results showed that Benefit-cost ratio of cucumber (grown in one and two periods) is 1.4 and 1.33, internal rate of return is 36% and 34% respectively. Net present value are positive, so cultivation of cucumber is economically. Benefit to cost ratio of tomato is 1.76%, internal rate of return it is 49% and net present value is positive, which indicates cultivation of tomato product is economically. The results showed that greenhouse cultivation of tomatoes and cucumber vegetables have Economic justification in Neyshabur. Iran.

**Key words:** Economic evaluation, Greenhouse, Cost benefit ratio, Internal rate of return, Net present value.

The emergence of successive droughts in Khorasan Razavi province during the last few years has led farmers to think about new solutions to deal with the lack of water fall. It is considered that the amount of cultivated plants require less water and shorter time farmer given the considerable profits. In this context, the off-season production plants (cucumber and tomato) in a controlled environment like a greenhouse can be a viable solution due to the current situation in the province. In addition to creating jobs, generating increased revenue to the profusion of small scale. So due to limited water resources in recent years, recognition and economic aspects of this technology can be effective in its further development. Economic study of the project before its implementation help to run or not to run it.

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Action to correct investments to meet growth, economic and social development objectives has undoubtedly a decisive role in the fate of the societies. In this domain, investment in the agricultural sector should be based on the principles of project design and then economic assessment process use to evaluate projects. Considering that investigated of financial justification of projects is usually done in a state of uncertainty and no confidence in the future of the economy, Therefore, the sensitivity analysis is a very useful process to assess the investment risk (Tang and Thomas, 1990), Hence the importance of this study is that using three methods of benefit to cost (B/C), internal rate of return (IRR) and the net present (NPV) to evaluate economically all greenhouse cucumber and tomato production units located in Neyshabur, Iran.

### Literature review

Some studies in this area are as follows: Gharahbaghi. And Gharahbagh (2005), showed that

Greenhouse production, despite the fact that more jobs, better performance and more efficient use of resources, but the relative advantage and social benefits are less in comparison with outdoor production. Salem (2009), the study concluded that the production of greenhouse cucumber and melon crops, tomatoes, showed that melons in the open air is more economical than greenhouse cultivation. Turki Hrichgan (2005), showed that greenhouse production of flowers to the greenhouse vegetable production is more economical. In this study required data and information were collected by two methods of documentary study from formal resources of libraries and other resources such as Jihad Agriculture in Neyshabur by completing the questionnaire and interview of greenhouse cucumber and tomato producers in the crop year 2011-2012 in Neyshabur, Iran. To analyze data and estimating models Excel software package was used. Several methods are proposed for review and economic evaluation of projects. In this study, three methods such as benefit to cost (B/C), internal rate of return (IRR) and net present value (NPV).

#### Methodology

Several methods are proposed for review and economic evaluation of projects. In this study, three methods such as benefit to cost (B/C), internal rate of return (IRR) and net present value (NPV) (Esconejad, 2004).

#### Internal rate of return (IRR)

$$\sum \frac{B_i - C_i}{(1+r)^n} = 0$$

R is rate of return on investment and represents the maximum interest rate that can be invested. If the internal rate of return is greater than the rates of banks the project is justified economically if it less than one the project is not justified economically.

#### The net present value (NPV)

$$\sum \frac{B_i - C_i}{(1+r)^n}$$

Is a measure of the discount rate, that calculate the net present value of the projects. If the result is positive, which indicates justifiably plan

#### Benefit to cost (B/C)

$$\frac{B}{C} = \frac{\sum B_i / (1+r)^n}{\sum C_i / (1+r)^n}$$

This is a measure that calculate the present value of benefits attributed by the total present value costs in a given discount rate. If this ratio is greater than one, the project is justified economically if it less than one, the project is not justified economically. In all three of these methods:

C: All costs, including fixed costs and variable costs.

B: benefits and income from the sale of products.

n: number of years is studied

In this section, fixed and variable costs of greenhouse ( cucumbers and tomatoes ) has been studied.

Average variable cost for the cultivation of cucumber in one period is 183.5 million riyals and for cucumber in two period is 27.1 million riyals and for tomato product is 183.5 million riyals in 540 meters per unit. Noted that based on studies conducted in research cultivation of greenhouse cucumbers to be conducted one or two courses. So some farmers began cultivating their greenhouse of September 15 and runs until May. Others from 15 September to 15 December, devoted to one period and from february to late May devote to other period of cultivation. So they are exploit in two courses per year actually. So cultivation of cucumber breakdown in one or two period in per year.

## RESULTS

Fixed costs included the cost of constructing a greenhouse structure ,cost of electricity , power points , water points , lighting systems , machinery and equipment needed .The average fixed cost is considered sixty million Rial in 2011 year .Another Survey on the construction costs for the production of greenhouse cucumbers , greenhouse showed that maximum cost, minimum cost is 55000000 Rial and average cost is 60000000 Rial. Maximum sale price of tomato is 8000 riyals minimum selling price is 5,000 Rial and average

selling price of it is 6,000 Rial. Average selling price of 6,000 Rial cucumber maximum sale price of cucumber is 6000 Rial . Minimum sale price of it is 2,500 Rial and average selling price of it is 4,000 Rial. Several factors can affect the selling price of greenhouse crops , the main ones are:

- 1 - The amount of distance and proximity to the sales center .
- 2 - The amount of product entering to the market
- 3 - Shipping costs and weekly market to selling

product.

The average yield per unit of greenhouse cucumbers (grown in one period) 10 -ton with selling price of 4,000 Rial per kilo and for greenhouse cucumbers (grown in two period) is considered 12 tons in the same price. .For average yield of tomato are considered 8 tons with selling price of 6,000 Rial .There are many factors that affect the performance and selling price of tomato which can be referred to the amount of greenhouse

**Table 1.** The results of economically analysis greenhouse product in 2011-2012 cropping year in Neyshabur

NPV(RIALS)	IIR	B/C	Product
87455216	36%	1.4	Cucumber(cultivation in one period
82347067	34%	1.33	Cucumber(cultivation in two period
105312275	49%	1.76	Tomato

Source:: research findings

temperature. Also the time that product supply to market can affect sale price.

In this study assumed for the construction of a single house loan obligations are not entitled to any funds so all investment is personal . Life useful project has been assigned 15 years .During these 15 years, all equipment and machinery used in the greenhouse and the greenhouse structure are depreciated at the end of the fifteenth years and any residual value

According to the above results it can be seen that the cultivation of cucumbers in one and two period as well as tomato crop economic justification. Benefit-cost ratio of one cucumber is 1.4 this ratio is greater than one. it indicates that 1.4 riyal revenue is generated for a penny fee, during the period of operation.

The internal rate of return is 36% It higher rate of interest rates . It show that the rate of return on capital would be 36% in this case. net present value is positive, so cultivation of cucumber in one period is economically.

For cucumbers ( grown in both periods ) benefit to cost ratio is 1.33 and internal rate of return is 34% and net present value is positive , which indicates that cultivation of cucumber in two period is economically. For tomato product benefit to cost ratio is 1.76% ,internal rate of return is 49% and net

present value is positive , which indicates that cultivation of tomatos product is economically. So plan for greenhouse crops (including cucumbers and tomatoes ) have economic exploitation in Neyshabur, Iran.

## CONCLUSION

The present study concluded that the greenhouse cultivation of cucumbers and tomatoes were found economically feasible.

### Suggestion

According to the findings, recommended the following:

- 1- Providing facilities and services for construction of greenhouses and timely supply of seeds and other inputs required.
- 2- Create Database in about the greenhouse, until greenhouse owners record all information about the construction of greenhouses, consumption of inputs, production, prices, marketing, and marketing.
- 3- Improvements in transport greenhouse products:
  - A) optimal location for the construction of greenhouses.
  - B) providing timely inputs.
  - C) Research to improve performance.

D) Increasing greenhouse according to the grading and packaging.

4- Enhance the knowledge of the greenhouse owners through:

A) Technical competence.

B) Establish counseling centers.

C) Continuing education.

D) Transfer of technology prototype greenhouse owners.

D) Website development.

E) Publishing educational materials.

5- According to the results, it was found that tomato products are more profitable and yield and its price is higher than cucumber in this region, Therefore it is recommended to adopt the necessary measures for expand the cultivation of tomato products in this area.

#### ACKNOWLEDGEMENTS

This paper is extracted from a research project entitled : Sensitivity analysis of investment in the production of greenhouse vegetables in Neyshabur , that this project is sponsored by the Islamic Azad University of Neyshabur in Iran. So be sure to thank of Vice President and all staff of university research for their sincere cooperation.

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