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Optimal model of cultivation and water demand with environmental considerations in agricultural sector of Yasoouj plain

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Abstract

The aim of this study was to integrate environmental goals including reducing water use, chemical fertilizer and chemical fertilizer with the objectives of the exploiters, including increasing the gross margin (revenue) and yield, or the gross return variance. The data used, such as the pattern of production and use of inputs and price of them, were obtained from the randomly selected beneficiaries. Since multiple objectives were evaluated simultaneously, multi-objective planning approach was used. The study found that there is an exchange between the ecological objectives which can be considered as the policy-makers' objectives and beneficiaries' objectives and it is necessary to choose a combination of these policies with planning.

Keywords: multi-objective planning, beneficiaries, risk, ecological

Introduction:

Like any other organizations, banks face many changes through the history. Based on their situation the banks should try for stability and surviving and should use new methods of marketing and construction. Moreover during the last decade because financial section has faced many changes it has caused low development and high competition. In this situation the trust between the customers and staffs will decrease and all Banks are trying to have this significant relation between their customers and staffs and it will be possible only by noticing staffs' performance and increasing man power.

Staffs' performance affect on the performance and activities of Organizations. The performance of employees means the results of done activities in an organization. The standard or benchmark key is performance prediction in the context of the present. This framework is a factor for analyzing groups,

organizations and people. The Oxford English Dictionary as "to run the application, do not define anything ordered or committed. The researchers want to know what factors affect on organizational performance. One factor affects on staffs' performance is talent management of the organization.

Recent researches show that many organizations cope with lack of hardworking staffs. Sparrow and Hill Trap (1999) by growing problems related to the lack of talent in many European countries have concluded that in the twenty-first century people who need a wide range of skills and abilities needed to deal with the needs of the companies have been predicted. Big companies all over the world try to catch the talents by competing with other organizations. So the organizations should have the ability for Identifying talented individuals, providing them with the necessary training and maintenance of valuable personnel. Nowadays the researches show that talent management is a scientific major but its effectiveness.

This study is going to talk about the effect of talent management on performance of staffs of Refah bank. The results of this study will give experts and manager's clues and needed info for managing the talent of the staff and finally their performance.

Theoretical basis of research:

Talent management

Studying the literature of talent management gives us different definitions of it.it means strategic management in an organization. Purpose of ensuring a good supply of talent for matching the right people with the right jobs at the right time is based on the organization's strategic goals.

Some say it includes all the talent management, human resources, management and technology. Talent management generally refers to the exploration, discovery, selection, maintenance, development and improvement, utilization of workforce restructuring. Another group of researchers argue that better talent management as a set of issues to be considered. It is used as a point of view or mental attitude towards this perspective. a perspective talent management believes that talented people play a key role in the success of the organization. Talent management is a strategic management that is the systematic identification of key positions in which these posts are the key to sustainable competitive advantage. Storage capacity of the organization to fill key positions of responsibility is the responsibility of this type of management.

Talent management ensures that there are good people with the right skills in the right place of business in order to achieve the expected goals of the organization.

Attracting talents: attracting talent includes all issues related to the recognition of a set of high-level skills for the jobs needed by the organization.

Discovering talents: it's the process of discovering talented staff among the qualified candidates that will be able to do their jobs the best.

Development and improvement of talents: Huy (2009, quoted by farmers and shepherds Khalili, 2010, p. 11) states that the development and improvement of skills in the application of advanced and appropriate talents. The staffs will catch needed info to supply business needs in the future.

Protection of talents: Subsystem to maintain the talent management system with the goal of which is to help people to actually convert all its power. They suggest that these subsystems are connected directly to compensation. Most people are motivated by pleasure through the use of talents and gain points.

Staffs' performance

The stability of activities of organizations depends on the performance of the staffs.
Armestrang defined performance as"To achieve the quality and quantity is determined". Oxford English encyclopedia defines it as "Run, exercise, doing everything ordered or committed". In addition, in connection with the definition of outcomes and outputs, but also show that the performance of the work and the result. Therefore, the performance can be considered as behavior. The term higher performance and efficiency of a system refers to the process of a system. It is Performance of activities that have to be done and the results of those activities. When employees feel that some of the decision making on how their performance is unreasonable and unfair does not increase the level of commitment and motivation for them to continue. It is also likely to reduce their level of productivity.

Bramach (1988, cited in Armstrong, 2007, p. 12), had a more comprehensive view of the head, which includes the behavior and performance results. He argues that "the meaning of behaviors and outcomes. Behavior and performance factors are derived from the idea to convert ". Behaviors not only the means to achieve the results are not, but are in turn a consequence. Attempts of organizations are to improve performance and discover hidden talents among staffs. They can also deal with the problems raised in crisis and prepare for the administration.

Research Background

Nopasand Asil et al in a study named "studying the relation between talent management and organizational performance have concluded Among the activities related to talent management and quality of service and innovation in the provision of services, there is a significant relationship and The necessary measures in order to retain talent in the organization has the most impact on the quality of services and Attracting top talent to the most impact on organizational innovation is increasing.

Taleghani et al in a study named"Examine the relationship between talent management and performance of faculty members of Isfahan University" concluded that Talent management strategy, a significantly positive effect on the performance of faculty members of the University and Promote talent management strategy will improve the performance of employees.

Hossein Mehravani et al has studied the Effect of implementation of talent management on organizational performance (studied in Gilan PMO) and showed Management of talent - talent, retention of management, career development, retention and performance of financial and non-financial organizations, there is a significant positive correlation.

Haj nabi et al has studied"Relationship between talent management and performance of nursing staff in Karaj". Between employee performance and talent management in government hospitals, there is a significant relationship. With the joint efforts of managers and nursing staff and giving more responsibility to the Department of Human Resources, will be the most positive consequences of the behavior and performance of employees created.

(Swim, 2009) in his doctoral dissertation, with mixed methods research in the service of a company in the United States, to evaluate talent management systems and to make the commitment of staff. Results of semi-structured interviews showed how the human resource management and organizational development can protect and enhance their talent management system.

Ayd Muelhi has studied "The effects of the adoption of ICT on the performance of companies in the manufacturing sector in Tunisia» and concluded Strong positive relationship between the use of ICT is efficiency. The results showed that the combination of ICT and human capital increases the efficiency of enterprises.

Research methodology

Introduction

In a study, Han et al. (2011) developed a multi-objective linear planning model with interval parameters. The model developed was implemented for the allocation of water resources with different qualities to the urban-agricultural and industrial consumers of the city of Dalian, China. This model seeks to maximize the economic, social and ecological interests. The results show that the proportion of the water used is increasing and the proportion of the water used in agriculture is decreasing compared to total water consumption.

In recent years, pollution and destruction of many of the country's water resources continue unabated, and therefore, in some areas, the water supply is not able to meet growing demand. So, it is clear that there will be serious conflict between ecological objectives and economic interests of farmers. (Amirnejad and Bahman Puri, 2013).

Despite consi Abrishamchi et al. (2005) carried out the adaptive planning multi-criteria decision-making technique for water resources management in the city of Zahedan. Adaptive planning was conducted to help decision-makers with selection of options for both types of water distribution in the city. The results showed that this comprehensive approach is suitable for urban water management. (Abrishamchi, 2005)

derable investment done in the water sector in recent years, the rising cost of water extraction from per cubic meter of the new water resources in the country, overexploitation of some existing water resources, lack of proper nutrition of surface and groundwater resources, lack of the maintenance and conservation of soil and water resources of the country, the growth of the industrial sector and urban development and finally the phenomenon of drought in recent years, give rise to contamination and destruction of the country's water resources. As a result, the water supply in some areas failed to meet the growing demand, so that water has become a competitive commodity for various uses. These limitations especially in khozestan province which is facing fluctuations in rainfall for years, are more conspicuous. For this reason, in recent years administrators and planners focused on the management of water demand as well

as the management of water supply (water resources). Ministry of Energy claims that the water fees collected from farmers' do not provide the costs of water extraction and distribution, considers it necessary to revise the current rate. The low efficiency of irrigation needs investment in water-saving technology. However, it has been claimed that water inputs relative low price has not provided incentives necessary to replace capital technology by water-saving technology, and as a result, water waste in agriculture is at an unacceptable level (Ministry of Agriculture, 2011).

Materials and Methods

The multi-objective planning, different objectives enter the model as the same limitations, and in each limitation, the value of the right side represents the ideal level or optimal value that has the decision-maker of the intention to achieve that level. According to the aforementioned objectives, it is necessary to use multi-objective planning model to allow the pursuit of the objectives. This approach can optimize multiple objectives simultaneously conditional on limited resources. However, most of the time, a series of solutions are obtained rather than an optimal solution, and it can also allow exchange between solutions. In general, the mathematical form of a multi-objective planning model is as follows: (Francisco & Mubarik, 2006):

$$
\begin{aligned}
&Max\, Z(x) = (Z_1(x), Z_2(x), ..., Z_h(x), ..., Z_k(x)),\\
&Z_1(x) = Z1(x_1, x_2, ..., x_n)\\
&Z_2(x) = Z2(x_1, x_2, ..., x_n) \qquad (1)\\
&.\\
&.\\
&.\\
&Z_h(x) = Zh(x_1, x_2, ..., x_n)\\
&.\\
&.\\
&Z_k(x) = Zk(x_1, x_2, ..., x_n) \qquad (2)\\
&Subject\ to: \qquad X \in F, X \geq 0
\end{aligned}
$$

Where $Z = (Z_1, Z_2, ..., Z_K)$ is the target functions vector with components Zi (i=1,2,…,k) of individual target functions, and Xi (i=1, 2, …, n) is the area under cultivation dedicated to the product i.

In general, there are three ways to solve the multi-objective patterns. These ways include the gravimetric method, binding method and multi-criteria simplex method. Method of limitation impose is uses more (Francisco & Mubarik, 2006).

In the binding method, the *h*th target function is optimized, while k-1 remaining targets are included within the limits:

$$Max\, Z(x) = (Z_1(x), Z_2(x), ..., Z_h(x), ..., Z_k(x)), \quad (3)$$

$$Subject\ to:$$

$$Z_1(x_1, x_2, ..., x_n) \geq b1 \quad (4)$$

$$Z_2(x_1, x_2, ..., x_n) \geq b_2$$

.

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.

$$Z_{(h-1)}(x_1, x_2, ..., x_n) \geq b_{(h-1)}$$

$$Z_{(h+1)}(x_1, x_2, ..., x_n) \geq b_{(h+1)}$$

.

.

$$Z_{(h)}(x_1, x_2, ..., x_n) \geq b_{(h)}$$

$$X \in F,$$

$$X \geq 0$$

Where *bi* is the binds set for each of the limitations in the desired binding optimization.

Results and Discussion

In Table 1, among beneficiaries in all pattern, only three products of wheat, corn and tomatoes are selected. Area under cultivation of watermelon in the pattern of minimum water consumption is zero, but in the pattern of maximum yield, the area under cultivation is increased dramatically and reaches 2.2 hectares of the total farm. In the pattern of minimal risk, the area under cultivation of wheat and corn is increased and the area under cultivation of tomato is associated with low volatility, and this is while in this condition, no watermelon will be cultivated, and hay will not be added to the cultivation basket. In the maximum yield pattern, watermelon cultivation portion increases while alfalfa is added to the cultivation basket with a high portion, and the portion of wheat and corn is decreased, while the reduction of corn portion is greater than the decline in the portion of wheat. There is no much difference in patterns conditions in the optimal solution of the three ecological patterns. In other words, by reducing consumption of water, chemical fertilizer and pesticide consumption is also reduced. Here again we see that in the pattern of minimal risk, the area under cultivation of wheat is higher compared with the three ecological patterns. This condition is due to low risk of wheat production whose price is guaranteed. In the pattern that shows the maximum yield, gross margin shows a significant 25% increase, and other objectives do not show significant increase or decrease except risk variable, and risk is partly reduced. In

general, in different patterns, the level of other objectives can be improved or at least maintained at current levels while optimizing the level of desired objectives.

Table 1. Area under cultivation and yield of current, optimal maximum yield, minimal risk and minimal water consumption patterns among beneficiaries

	Ecological patterns					
Product Name	Current pattern	maximum yield optimal pattern	minimal risk optimal pattern	minimal water consumption optimal pattern	minimal chemical fertilizers consumption optimal pattern	minimal chemi pesticides consumption optimal patter
Wheat	3	2/42	3.6	3.85	3.4	3.4
Corn	٠/85	0.06	1.1	0.76	0.35	0.35
Tomato	٠/55	0.78	0.3	-	0.1	0.1
Watermelon	٠/4	2.2	-	-	-	-
Alfalfa	-	-	-	-	-	-
Gross margin (Million Rials)	66/54	88.79	67.24	66.77	66.77	66.77
Variance (Risk)	480	433	254	340	289	289
Water consumption (Cubic meters)	62350	62600	58600	40500	46700	46700
Chemical fertilizer consumption	3840	3460	2650	2430	960	960
Chemical pesticides consumption	19/6	15.2	10.97	10.97	10.97	10.97

Source: Research findings

As it is observable in the table, at the level of maximum yield, all desired products locate in the cultivation pattern, but alfalfa and watermelon have no place in ecological patterns. This is while, in the ecological pattern of minimal water consumption, tomato is also eliminated from cultivation patterns. The area under cultivation of wheat in the most optimal patterns is increased compared to current levels except the maximum yield pattern where the area under cultivation of wheat and corn have declined considerably. While the area under cultivation of wheat in the minimal risk pattern have increased considerably compared to the current condition which is justifiable by the guaranteed price of wheat and low risk of production.

In all optimal patterns, only two products of wheat and tomato were selected and two products of corn and watermelon are placed in some patterns. The area under cultivation of wheat in ecological patterns in the pattern of minimal consumption of chemical fertilizers is 0 and its maximum in water consumption levels was 2. In the pattern of minimal consumption of chemical pesticides, corn had no area under cultivation. In addition, in all patterns except the pattern of minimal consumption of fertilizers, the area under cultivation of was less than 2 hectares. The three ecological patterns were similar. In other words, reducing water consumption, the use of chemical fertilizer and pesticides has been reduced.

In the case of chemical fertilizer input, it can be observed that from a step on, while having the minimal variance and low consumption of other inputs like water and chemical pesticides, we can reach the same planning yield. So further use of this input has no considerable impact on the yield. So we can achieve higher yield by using less chemical fertilizer input, other inputs and variance. So we can take advantage of this relative improvement in the pattern that using less fertilizer input compared to the current condition where its consumption is relatively high, we can achieve high yield level while using less input.

In different patterns, corn and wheat had received higher priorities. Increasing inputs consumption, the area under cultivation of corn and wheat have been relatively increased, while products like tomato and watermelon had less portions compared with the two products mentioned. Reducing the risk, it is observed that corn and wheat are in higher levels, while the use of chemical fertilizer inputs and other inputs are also relatively increased. Hence reducing risk through increased use of chemical fertilizer and also cultivation pattern change are in favor of corn and wheat.

In general, if we consider the current level of available water the guarantee for its sustainable use, it is considered desirable that we maintain wheat beneficiaries at their current level and reduce the area under cultivation of forage corn in favor of tomato. Except in the case of water, these conditions will be achieved in two other inputs, where reducing their consumption is an ecological objective. But if the current level of water is considered as a threat to its sustainable use, we need to consider reducing the area under cultivation of wheat. The results showed that for the further ecological considerations, reducing the area under cultivation of wheat and increasing tomato cultivation are recommended more. In the case of chemical fertilizer and chemical pesticides, less concern were observed in all patterns due to the massive reduction possibility.

In general, for most models, it was observed that there is the possibility of improvement in two ecological objectives out of three, while we can provide improvement in one of the two objectives of beneficiaries. But what is certain is that the improvement is possible in the current pattern of beneficiaries which includes both ecological objectives and beneficiaries' objectives.

Based on the findings of this study and the existing patterns of beneficiaries, following suggestions can be considered effective in achieving the beneficiaries' objectives, and ecological objectives, simultaneously.

1. Simultaneous focus on beneficiaries' and ecological objectives
2. Move to change the cultivation pattern with regard to ecological considerations
3. Developing regional cultivation pattern based on the improved efficiency of using inputs of water, fertilizers and pesticides

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