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RISK EVALUATION IN THE DECISION MAKING PROCESS

Eng. Bogdan DUMITRU[1]

Scientific Coordinator: PhD. Assoc. Prof. PhD. Vasile ZECHERU[2]

[1]University of Worcester, Worcester Business School, Henwick Grove, WR2 6AJ, Worcester, United Kingdom, tel./fax. (+44) 01905 855000,
E-mail: bogdanfdumitru@yahoo.com
[2]University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: + 4021.318.25.67

Corresponding author email: bogdanfdumitru@yahoo.com

Abstract

By acknowledging the fact that it is more efficient, wise, simple and cost-effective to prevent rather that repair any disaster, the present article is drawing our attention to the importance that Risk Management plays in the decision-making process. In the following article there have been pointed out the purpose and process of decision making, what role does risk management play in this process, what results should be expected and how the science of Management can be applied in the Land Reclamation field. What role does Risk Management play in Project planning and how is it helping it to increase its performances and efficiency. Towards the end, we will acknowledge the benefits of risk management in project planning and, how simulating and forecasting the results helps in achieving better results.

Key words*: decision making, risk management, disaster management, land reclamation works, management, sustainable development, risk probability, prevention/correction decision.*

INTRODUCTION

Decision is defined as "a moment, in an ongoing process of evaluating alternatives for meting an objective, at which expectations about a particular course of action impale the decision-maker to select that course of action most likely to result in attaining the o objective"(Harrison, 1999).A simpler definition it that decision-making is "a commitment to action"(Mintzberg, 1983).

Decisions can be:
structured- clear, unambiguous and easily definable or unstructured – unclear, ambiguous and difficult to define;
programmed - relay on some form of routine or non-programed – have no guidelines whatsoever;
strategic – point the direction of an organization or operational – day-to-day decisions(Teal et. al, 2003).

In order to have a positive outcome, a decision must be taken in a proper context. The context is set by the political, economic, social, legal, technological and environmental factors.

Theoretically, the purpose of the decisions must be rational and to aim an objective that must be achieved. In reality, (Anthony, 1986) states that "the inability of superordinates to learn from their subordinates about what was going on, the self-protectivefeigning of ignorance, the side–stepping of official procedures to gain personal advantage, the deliberate use of change and confusion… the construction and maintenance of ambiguous rules, and the claims and obligations of friendship" happen and affect the context in which decisions are made.
Within the managerial process there is a possibility that the task will not be accomplished and the outcome will be a negative one. This is called a risk and, like any other part of a project must be managed.Risk management can be operationalized as the number of different kinds of project risks are analyzed,and by evaluating risk probability the manager is able to choose the appropriate strategy (Cova and Holtius, 1993).

Risk Management is useful in any field of activity, including Land Reclamation. In order to ameliorate a certain land, a proper risk

evaluation must be made in order to apply the proper works in the proper way.

Our country faces all three possible issues that a land can encounter:

(i)- the excess of water – which may come from rainfall and \ or from groundwater located at a shallow depth, difficulty which can be remedied by drainage works. Another cause of excessive water are floods, situation which is remedied with works on rivers and damming. This situation is to be found on about five million hectares in our country, the land with small slopes (1-3%) and a high content of clay. Factors that cause water excess are both natural and anthropogenic. After draining the soil is more ventilated, microorganisms activity can take place in good conditions, physical and hydro conditions improve along with soil structure and its permeability. The plant root system can develop normally and healthy, chemical fertilizers are no longer washed away, hydrophilic plants are controlled, pests and diseases specific to areas with excessive water are prevented.

(ii)- water deficit which is caused by climate change.We observe this as being a problem increasingly harder to neglect. This problem can be controlled by applying a rational amount of irrigation. For irrigation it must be taken into account soil-water-plant-climate relationship and is necessary to understand the penetration processes, storage, movement, and loss of water in the soil. It also must be considered the plant vegetation stage depending on which it should be given a larger or smaller amount of water. The best way to find ground water requirement is for the engineer to go on the field, take a soil sample and determine the water deficit in a laboratory. Ideal humidity range for the plant is between minimum threshold and field capacity thresholds which differ depending on soil texture. Irrigation norm is determined by the consumption and water loss of the plant, the initial and final water reserves in the soil, rainfall and groundwater contribution. Watering methods are determined by the ground level and the culture which is planted. The most common methods are sprinkler irrigation, dropwise and for rice using submersion (Berca, 2006).

(iii)- soil erosion - due to solar radiation and gravity on the Earth's crust occurs an inexhaustible kinetic energy which is keeping the soil in a constant transformation, both water and air contributing to this phenomenon. Agriculture shows interest mostly for the first 20-30 centimeters which represents the active layer of soil, layer where there are most of the nutrients that the plant needs. Annually in our country are lost an average of 189 tons / square km. This phenomenon is produced on slopes and in our country about five million hectares are affected by erosion and the phenomenon is strong on 1.2 million hectares. Obviously the most significant soil losses are recorded in mountain and hill areas, areas that have been deforested, irrational exploited, and on lands which although it was found that the soil erosion process manifests, no action was taken. The main factors influencing soil erosion are slope of the land, slope length, vegetation and torrential rains. Methods to control this phenomenon are from the simplest such as plowing parallel with level curves, to their most complex and expensive such as embankments (Constantin and Maracineanu, 2005).

For all these problems, specific works must be made. When designing those works, a thorough planning must be aimed concerning a variety of factors. Calculating the risk plays a major role in designing land reclamation works. Besides the usual risks calculated in any project, the most important land reclamations works are designed to resist a natural disaster with a probability of 99.9%, 99% or 95%. The percentage is chosen considering economic factors.

MATERIALS AND METHODS

The planning process

In order to have a successful project a thorough plan must be made. A good planning process starts with asking the right questions. By assessing the environment, the important questions must be answered. "*Where are you now?"*What is the internal and external

situation?"*Where do you want to go*?" Know the aim. "*How can we get there?"*All the possible paths must betaken into consideration. *What is feasible, possible?* The path that will be adopted is the one that suits the goal and situation the best.

A planning process can be broke apart in four phases: Visioning, Analysis, Recommendation and Direction(Cassady, 2006).

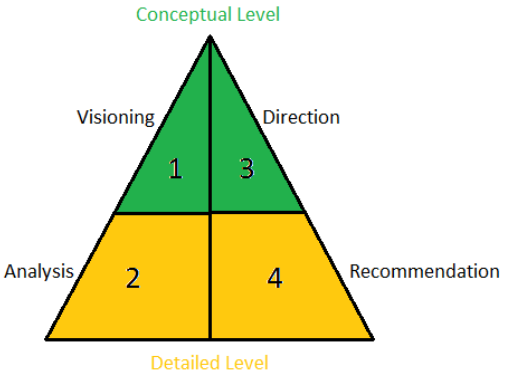

Figure 1. Planning Process Phases

Every plan must have all the important components like key objectives, vision, mision, busdgets, values, key initiatives, and so on. All these are parts of a planning process and the present paper suggests grouping these parts in to four phases. After doing that, two different process levels can be distinguished. There will be a conceptual level, which describes the holistic view of the project and is represented by Vision and Direction; and a detailed level which represents the foundation of the planning process and has as its components Analysis and Recommendation. The last two asses the environment regarding different points of view, judge how the project will be affected by different factors and how the situation will be managed.

1) Visioning

During the first phase, the planning project and process are initiated. The plan, scheduale, tasks, and deliverables are developed. The process that will be used to develop the plan will be defined. The individuals who will be involved in the planning process will be identified and their roles and responsibilities acknowledged. The process and the vehicle to communicate the status of the strategic planning is established. This phase ends by formally announcing the strategic planning effort to those involved in the process.

2) Analysis

The second phase is defined by an objectively analysis of the environment. At this phase the most common management tools used are PEST andSWOT.

PEST tool analyses the characteristics of the environment regarding four different points of view written in Table 1, and from those characteristics, management team draws the conclusions that define de environment.

Table 1. PEST tool

Political	- -
Economical	- -
Social	- -
Technical	- -

The conclusions drawn using the PEST tool can be seen as Strengths, Weaknesses, Opportunities or Threats in the SWOT analysis table.

Table 2. SWOT analysis

Internal	
S	W
O	T
External	

By using this tool, management team can have a holistic view of the internal and external environment, can evaluate it more accurately, and take the appropriate decisions.

This phase ends with a series of initial recommendations for all areas of the project (Zecheru and Năstase, 2016).

3) Direction

In the direction phase, the mission and vision are articulated using the project situation and direction as a basis. The strategic objectives are formulated and each goal and way to achieve that goal is reviewed. The important part of this

phase is to determine how to measure the value of progress. Last but not least, at this phase you prioritize your tasks. (Cassady, 2006)

4) Recommendation

In this phase, the roadmap outline is detailed for a longer period of time. The costs, time and resources are summarized. Various options of tackling the situation are identified and, advantages and disadvantages of each option are analyzed. At this stage, risk analysis plays a major role. As seen in Picture 2, each risk is evaluated, and according to that a proper form of mitigation is established.

$$E_i = p_1 c_{i1} + p_2 c_{i2} + ...p_n c_{in} = \sum_{j=1}^{n} p_j c_{ij}$$

Where:

E_i - Monetary value expected to be paidfor the project's case scenario adopted

p – Payment value to fix/prevent the unwanted outcome

c_i - Probability that the event will happen

Of course, the probability for a certain event to occur, in economics, is subjective and the situation can be seen from an optimistic or pessimistic point of view.

RAM		Probability				
Severity		Frequent	Likely	Occasional	Seldom	Unlikely
		A	B	C	D	E
Catastrophic	I	Extremely				
Critical	II	High	High			
Moderate	III		Medium			
Negligible	IV				Low	

Figure 2. RiskAssesmentMatrix (RAM)

"There are three key aspects of risk. Probability is the estimate of the likelihood that a hazard will cause a loss. Some hazards produce losses frequently, others almost never do. Severity is the estimate of the extent of loss that is likely. The third key aspect is exposure, which is the number of personnel or resources affected by a given event or, over time, by repeated events. To place hazards in rank order we must make the best possible estimate of the probability, severity, and exposure of a risk compared to the other risks that have been detected" (ICMA, 2016).

In order to reach a rational decision while evaluating the impact of a certain hazard two factors can be taken into consideration: economic andsocial. The economic evaluation of one project's risk can be calculated by addingthe products between each amount of money spent to fix or prevent a risk that may appear and its probability of occurrence.

In engineering, on the other hand, the probability for a certain event to happen it is deducted empirically by counting the number of events occurred in the last one hundred years. So, depending on the nature of the decision that is taken, the manager will tackle the situation accordingly.

By the end of this phase you will have a detailed roadmap of the process, summarized costs, and identified risks, a developed communication plan and an ongoing process to keep the plan up-to-date(Zecheru, 2014).

RESULTS AND DISCUSSIONS

In order to understand complex situations organizations break the problems into well-defined parameters by using modeling and simulations. These practices are useful while forecasting the future of the project. As an ancient dictum suggests, "You cannot manage what you do not measure". The cause and

effect relationship between parameters can be measured, or estimated and quantified. Nowadays with the help of technology, i.e. computer, risk models can be easily developed and analyzed.

Accurate forecasting and planning are vital for the health of a project and should be defined by realism and sensitivity to change. Working forecast ought to be the result of a high-quantity data analyzed by a competent managerial judgment.

Forecasts are most commonly interpreted by using graphs (see Figure 3). The graphs are monitoring how a certain characteristic evolves in time. Traditionally, there are three characteristics and effects in a time series model that present interest for the forecasters:

- *trend* - which can be downward or upward
- *seasonal variations*–repeated peaks which occur during a certainperiod, which are obvious and significant.
- *random effects*–the frequency with which events that do not fit the pattern occur.

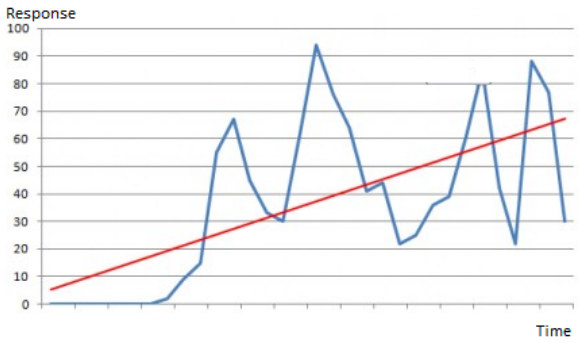

Figure 3. Response in Time (example)

Following a thorough analysis of the graph, the management team can plan more accurately, diminish the unpredictable outcomes and have a better control over the situation.

The general structure of decision-making outcomes is summarized in Table 3. An effective Risk Management will lead to outcomes that are framed in box "A", predictable and under control.

Table 3. Matrix of decisions and outcomes

MDO	Predictable Outcome	Unpredictable Outcome
Decision under voluntary management control	A	B
Decision under involuntary management control	C	D

The factors involved in the decision analysis are experience, judgment, team work and factual data which used to develop estimates of the chance of success or failure. The present article suggests four ground rules that must be followed:

i) Decision making must be a combination of human values and factual evidence.
ii) The core element in decision-making is the interpretation of factual data.
iii) While making a decision, the values can be seen as a filter that will affect the individual perception of factual data and there is no such thing as a set of universal human values.
iv) Within complex problem situations,inconsistency, human bias or personal agenda must be acknowledged(Teal et. al, 2003).

To summarize, it can be stated that in the decision making process two parts can be distinguished: one human and one factual; and both of these parts must be taken into consideration while assessing the risks.

CONCLUSIONS

Risk Management is one of the most important tools in the Decision-Making process and without it the chance of success of a project is diminished.

Risk is a factor the must be taken into consideration before a project starts, during a project and after a project is completed, especially in Land Reclamation field. If a risk is foresee and measures are taken against it, it can no longer be called a risk, is just another part of the project that must be managedfor the aim to be achieved. So, ideally a manager\engineer predicts all the risks that he

may encounter and transform them into tasks that must be completed. Experience taught us that there is no such thing as foreseeing all the risks so all that a leader can do is to predict as many issues as he can and, to be ready for the unpredictable.

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