

ARTICLE NUMBER :
238-859-1-SM
RECEIVED :
2019-07-02
ACCEPTED :
2019-11-29
PUBLISHED :
VOLUME : 05
ISSUE : 02
MONTH, YEAR
DECEMBER 2019
PP.952-956

Application of Grain Storage System based on Strategic Planning and Modern Techniques

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ABSTRACT

After a presentation of the management process of a grain silo, we present the necessity of the analysis and the identification of information in a grain silo while using a strategic planning based on the OOPP method (Objectives Oriented Project Planning). This kind of analysis leads to an efficient management of the activities of grain silo. In fact, the OOPP method constitutes a tool of a global systemic modeling enabling to analyze a complex situation by a hierarchically decomposition until reaching an elementary level allowing to an operational planning.

KEYWORDS

Strategic Planning, System analysis, OOPP method.

INTRODUCTION

Because of its geographic context, its climatic environment and its social tradition and culture, Tunisia with its alimentary tradition based particularly on the consumption of cereals, shows an important deficit of the national production and cereal consumption [1].

In fact, the country alimentary security requires an efficient management of basic food resources that are necessary for the balance of its equilibrium socio-economic system. This management depends on the global environment constituted by the production, consumption and transformation system.

The management of the cereal Resources in the country must be efficient and the transactions between the cereal purveyor (farmers producers, importation, stokers at a delivery) and the clients (farmers for seed, stokers at a conservation, millers, transformation industry must be excised

by a coherent and objective process based on the Cereal Grading System [2], [3].

In fact, a performance of a production structure or a service depends particularly on the performance of its information system.

The object of this paper is to present the application of strategic planning and modern techniques for the management of a grain silo while exploiting the OOPP method, GIS (Geographic Information System) and Fuzzy Logic techniques. The described application necessitates in the one hand, the use of the OOPP method allowing achieving to reliable information analysis and operational planning and in the other hand; the exploitation of GIS and Fuzzy Logic techniques in order to manage activities of grain silo.

We present the details of the application described according to the following methodology (Fig.1).

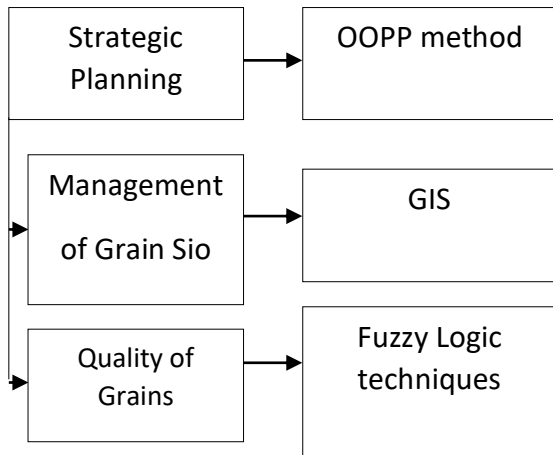


Fig.1. Details of the application

In fact, we use many modern techniques in the storage system in order to contribute to the upgrading of grain silo. Indeed in this paper, we present in particular the use of OOPP method.

MATERIALS AND METHODS

In order to analyze the complex activities of a grain silo, particularly the management of the stock we adopt a systemic approach allowing situating the entity in its intern or exterior environment. We adopt a codification for all centers in order to identify the different actors on the cereal storage system, private co-operatives, customers and millers. We adopt a methodological approach based on a strategic planning and the use of a systemic method [4], [5].

A. Strategic planning and Systemic analysis

The Strategic planning starts by seeking to define the vision how to attempt to shape the future [6]. The current approach to strategic planning assumes that it will be a collaborative process, rather than one person deciding what the vision and goals should be.

The strategic plan will define a small number, usually less than ten, of strategic objectives that, if they are met will result in achieving the goal of the group or organization.

The systemic analysis belongs to a scientific tendency that analysis the elements of a

complex process as a component of a set where they are in a reciprocal dependence relation. Its study field is not limited to the mechanization of the thought: the systemic analysis is a methodology that organizes the knowledge in order to optimize an action.

The main objective of the system-approach is to schematize all complex sets, lead to a modeling that enables to have an effect on it, after the comprehensiveness of its material configuration and its dynamic structure.

B. Presentation of OOPP method

A number of different approaches are in use to define the strategic objectives some of the more well know ones are ZOPP, OOPP and LFA.

The OOPP method constitutes a tool of a global systemic modeling enabling to analyze a complex situation by a hierarchically decomposition until reaching an elementary level allowing an operational planning.

In fact, the Logical Framework Approach (LFA) [19] is referred to OOPP in German, Ziel Orientierte Projek Planung (ZOPP) and in Word Bank as TeamUp This approach is a structured meeting process. This approach seeks to identify the major current problems using cause-effect analysis and search for the best strategy to alleviate those identified problems. The different steps of this approach are:

The first procedure in problem analysis is brainstorming [20]. All participants are invited to write their problem ideas on small cards. The participants may write as many cards as they wish. The participants then group the cards or look for cause-effect relationship between the themes on the cards by arranging the cards to form a problem tree.

In the step of Objectives Analysis, the problem statements are converted into objective statements and if possible into an objective tree. Just as the problem tree shows cause-effect relationships, the objective tree shows means-end relationships. The means-end relationships show the means by which the project can achieve the desired ends or future desirable conditions. Frequently many possible areas

could be the focus of an "intervention" or development project. The next step addresses those choices.

The objective tree usually shows the large number of possible strategies or means-end links that could contribute to a solution to the problem. Since there will be a limit to the resources that can be applied to the project, it is necessary for the participants to examine these alternatives and select the most promising strategy. After selection of the decision criteria, these are applied in order to select one or more means-end chains to become the set of objectives that will form the project strategy.

After defining the objectives, and specifying how they will be measured (OVIs) and where and how that information will be found (MOVs) we get to the detailed planning phase. We now determine what activities are required to achieve each objective.

The identification and analysis of exchanged information by the activities indicate the dynamics and the communication between the elements of the system that we propose to study or to manage. In fact, we define an information matrix that establishes a correlation between activities and their information.

A representation of the different steps of OOPP method using an algorithm is presented (Fig.2).

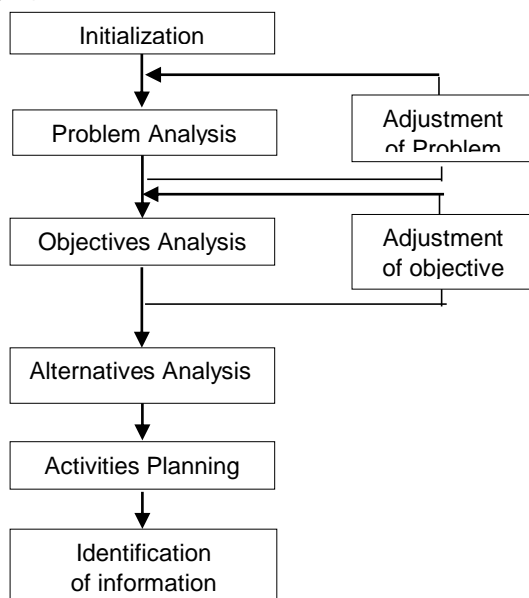


Fig.2. Different steps of OOPP method

RESULTS AND DISCUSSION

After OOPP analysis (Fig.3), three Specific Objectives are identified corresponding to the activities of management of grain silo (Program of the movement of cereals established, Movement of the cereals registered, Reporting elaborated) [16], [17].

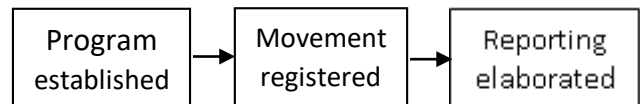


Fig.3. Process of Management of grain silo

The analysis of the Specific Objectives leads to result, intermediary result, activities... (Tab.1) (Tab.2).

Tab.1. OOPP analysis of Management of grain silo

N°	Code	Activity
1	GO	Management of grain silo assured
2	SO1	Program of the movement of cereals established
3	SO2	Movement of the cereals registered
4	SO3	Reporting elaborated

The systemic analysis of a production system has a mission to define the general strategy of the modeling study to achieve. This strategy must enables to fix with a precise making the limits of the modeling by defining the frontiers of the system to model and to specify between the data that are really exchanged between the different component of the production system and those that the modeling study will cover.

The different tools of the systemic analysis adopt a hierarchic analysis approach and allow answering to the pertinent questions in order to conduct a Project: What? How? Why? When? Where?

According to the method and the used tool, other parameters are defined like performance indicators.

Tab.2. Details of identification of information

N°	Code	Activity
1	R2.1	Registration of the information relative to cereals at the reception assured
2	A2.1.1	To register the nature of the cereals at the reception
3	A2.1.2	To register the origin of the cereals at the reception
4	A2.1.3	To register the lot of the cereals at the reception
5	A2.1.4	To register the N° of the order of the transfer at the reception
6	A2.1.5	To affect the N° of the lot at the Reception
7	A2.1.6	To register the date of the reception
8	A2.1.7	To register the quantity of the cereals at the reception
9	A2.1.8	To register the mode of the reception
10	A2.1.9	To register the N° of the voyage of lot of the cereals at the reception
11	A2.1.10	To register the quality of the cereals at the reception
12	A2.1.11	To register the eventual anomalies detected and the corrective actions done at the reception
13	A2.1.12	To register the reclamation at the Reception
14	A2.1.13	To establish the documents at the reception

CONCLUSIONS and SUGGESTION

An application of management in a grain silo is presented in the one hand, while exploiting a systemic approach based on the OOPP method enabling the analyze of complex situation, and in the other hand, a use of a GIS and fuzzy logic techniques in order to contribute to the upgrading of a grain silo and to the development and deployment of an information system.

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