

Application Objectives-Oriented Project Planning method of Grain Grading System

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Abstract— After a presentation of the grain activities in Tunisia, we present, according to a system analysis approach, the grain grading system. This analysis is based on the Objectives-Oriented Project Planning (OOPP) method. Then, a model describing the functioning of this complex system was established and has allowed us identifying the information that ruled it. An OOPP model of Information System of the grain grading system was presented.

Key-words— System analysis, OOPP method, Grain grading system, Information System development.

I. INTRODUCTION

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 [1].

Because of its geographic context, climatic environment and social tradition and culture, Tunisia with its alimentary tradition based particularly on the consumption of grains, shows an important deficit of the national production and grain consumption [2].

The management of its grain Resources must be efficient and the transactions between the grain purveyor (farmers producers, importation, stokers at a delivery) and the clients (farmers for seed, stokers at a conservation, millers, transformation industry: baking, alimentary pastes, animal nutrition...) must be excised by a coherent and objective process based on the Grain grading system [3], [4].

In fact, it's the grain grading system that determines the price of transactions at the sales and at the purchases of grains and consequently that excited the technical and juridical relations between the different interveners [5], [6].

The object of this paper is to present the grading system at the Office des Céréales (OC) in Tunisia and to apply a systemic approach exploiting the Objectives-Oriented Project Planning (OOPP) method that allows achieving a reliable information analysis.

II. PRESENTATION OF THE GRAIN GRADING SYSTEM

The determination of grain quality, on transaction on the organised market, is an indispensable operation to evaluate the grain product and its aptitude in storage. But in spite its importance, this evaluation besides done with a simplest manner based on visual appreciation and on the manager good meaning, particularly at level of collection, only for the criteria relative to specific height and, in some cases, to humidity.

Besides grains like any other biological product, change during their storage when they are bad conserved, causing degradations of quality and loss in quantity.

The official circuit taken by grains locally produced begin at the level of collection and lead to transform units passing by Silos and storage Units.

At every step, grains undergo a qualitative evaluation allowing to check their loyalty and to determine its commercial value.

This operation of quality evaluation of grains is excised by a grading scale at the time of all operation of entrance or exit of grains which principal points are: Basic Price (BP); Improvement (to add to basic price if grains have higher quality); Reduction (to reduce from basic price if grains have a low quality). The grain price is calculated [7]:

$$\text{Grain Price} = \text{Basic Price} + \text{Improvement} - \text{Reduction}$$

The different steps of the grain grading process are: taking samples, samples analysis (specific weight, humidity and impurities) and price determination.

III. SYSTEM ANALYSIS OF THE GRAIN GRADING SYSTEM

The model of the grain grading system that we propose means to describe the different activities of the process of grain evaluation and to consider it like an information system.

This model is characterised by quality specifications (specific height, Humidity, impurities...) and management parameters (Reception, Analysis demand, Analysis results, Payment, Sampling...) [8].

The number, the complexity and the interference of information exchange taken in the study of a model need a systemic approach defining the limits of the system (through establishing a communication between the outside environment) and identifying the principal activities and the parameters conditioning these activities [9].

The OOPP method, based on Zopp (Ziel Orientierte Projekt Planung) method was used. This method identifies all the activities hierarchically classified and their associated parameters: responsible, resources (infrastructure, equipment, human resources, logistic resources, information resources...), timing, place, realisation indicators [10].

The OOPP analysis allows answering pertinent questions conditioning all establishing project: What (result to achieve or activity to realise)? Who (responsible and his collaborators)? How (resources)? When (time)? and Where (place) ?

We consider that informational resources are determining on the strategic level and on the communication one [11]. The determination of these resources constitutes the base of all the information system. In fact, we reserve a particular importance to informational purpose and we consider all the parameters and all the functions like information that we must seize, treat and valorise. This information is evidently divided by the different activities taking into account their level [12].

A. OOPP method

The OOPP method constitutes a tool of a global systemic modelling enabling to analyse a complex situation [13] by its hierarchically decomposition until reaching an elementary level allowing an operational planning (Fig.1)

This method, widely used in the planning of complex projects, involves many operators and partners. In Tunisia, it was used in Development projects financed by bilateral or multilateral co-operation mechanism (with Germany, Belgium, Canada, World bank...), in upgrading (Mise à Niveau) different structures (Training and Employment through MANFORME project, Organisation of the Tunis Mediterranean Games 2001...) and in restructuring private and public enterprises...

The two determining steps for OOPP analysis are:

- The Scheme of Planing Project (SPP) that consist in establishing a global diagnostic of a situation by elaborating a Tree of Problems using a causal logic and by transforming it to a Tree of Objectives.

- The Scheme of Planing Activity (SPA) that, according to a logic « Medium - Detailed » lead to a hierarchic analysis of the results to achieve.

In fact, these steps constitute a preliminary action for establishing a Project that requires a global Piloting and Evaluation System (PES).

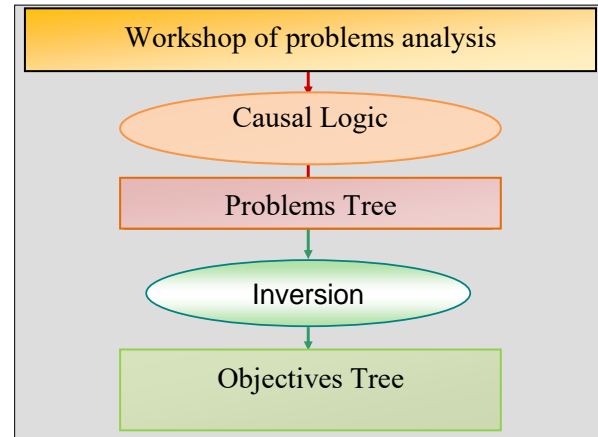


Fig.1- OOPP method.

B. Information Matrix

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. So, we define an information matrix that establishes a correlation between activities and their information. The information concerning an activity can be classified in two categories [14], [15]:

- An imported information by an activity is supposed to be available : it is either produced by an other activity of the system, or coming from outside,
- The produced information by an activity reflects the state of this activity. This last information may be exploited by other activities of the project.

In fact, the produced information by an Activity can be considered like a transformation of imported information by this Activity [16], [17].

In order to specify this information, we define an information matrix associated to OOPP analysis permitting to:

- determine the relations between the activities or between the concerned structures,
- identify the information sources,
- determine the manner in which the information is exploited.

To make sure of the quality of information system[18], we define some logic-functional rules reflecting the coherence, the reliability and the comprehensiveness of the analysis by an information matrix in which the lines are relating to Activities and the col-

umns to information. This matrix is constituted like this:

- the first line is reserved to the first activity A1,
- the first column is reserved to the first information If1 associated to this activity,
- if If1 is imported by A1, we inscribe « 0 » in the correspondent box, if it's produced by A1, we inscribe « 1 »,
- we pass after that to the second information If2 and we associate the correspondent binary character : « 0 » if the information is imported by the activity A1 and « 1 » if it's produced by the same activity,
- we proceed in the same way until all the information concerning A1 are exhausted,
- we pass after that to the second line correspondent to the second activity A2,
- if If1 concern A2, we inscribe the correspondent binary number (0 or 1 according to this information is imported or produced), otherwise, we leave a blank in the correspondent box, then we add the new information that concern the current activity,

- we follow the same step as far as exhausting of all activities and of all correspondent information.

We finally construct progressively a matrix of big dimension if the system is complex; it's constituted of « 0 », « 1 » and « blank ».

C. Model of the grain grading system

The model of the grain grading system developed is complex [19], [20]. The OOPP method applied to this system has enabled, by its steps of analysis and planning, to understand better and better the description of this model and to facilitate after that the different expressions of relations constituting this model.

The global objective of the model: Grain grading system assured lead to an analysis of the different steps proceeded in the evaluation system of grains. A Tree of Objectives (Fig.2) modelling the grain grading system is presented after validation by the experts.

An analysis of imported and produced information of grain grading system was done and an associated glossary of this analysis was established.

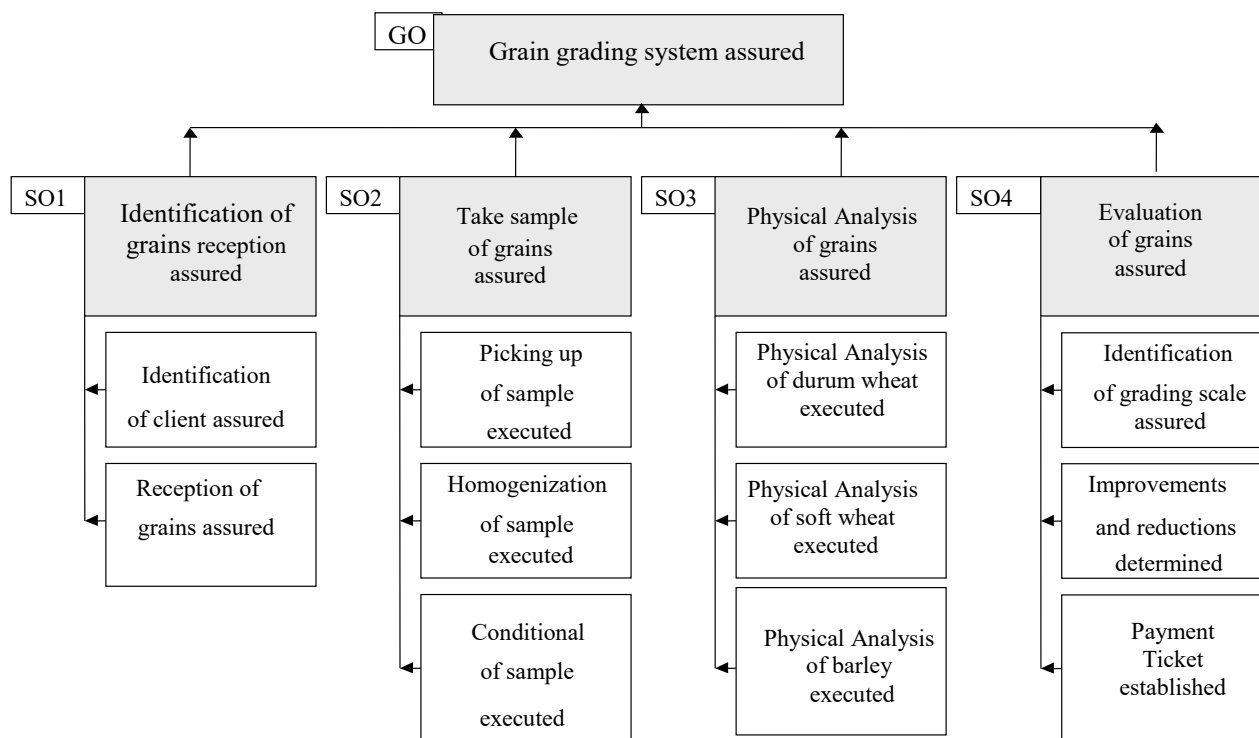


Fig.2- Tree of objectives of the grain grading system

IV. MODELING OF THE INFORMATION SYSTEM

The model presented (Table.1) illustrates eight specific objectives to achieve the global objective (OG): Information System of a grain grading system defined.

The Specific Objectives identified are:

- OS1: Management of the Information System;
- OS2: Security of the Information System;
- OS3: Circulation of the information;
- OS4: Appropriate information media;

- OS5: Analysis of effective information;
- OS6: Efficient information processing;
- OS7: Archive information;
- OS8: Characterization (properties / elements) of the information.

The decomposition of these specific objectives into results (Table.1) lead to intermediate results, activities, sub-activities, tasks and under tasks.

TABLE I
OOPP model of Information System of the a grain grading system

N°	Code	Activity
1	OG	<i>Information System a grain grading system defined</i>
2	OS1	Management of the Information System assured
3	R1.1	Improvement of the Information System assured
4	R1.2	Assessment of the Information System assured
5	R1.3	Control of the Information System assured
6	R1.4	Maintenance of the Information System assured
7	R1.5	Functioning of the Information System assured
8	OS2	Security of the Information System assured
9	R2.1	Security of the information assured
10	R2.2	Confidentiality of the information assured
11	OS3	Circulation of the information assured
12	R3.1	Implementation of a secure information flow circuit assured
13	R3.2	Availability of timely information assured
14	OS4	Appropriate information media assured
15	R4.1	Operation of information media assured
16	R4.2	Conviviality of supports assured
17	R4.3	Availibility of supports assured
18	R4.4	Supports of the information identified
19	OS5	Analysis of effective information assured
20	R5.1	Actions of Improvement proposed
21	R5.2	Causes of failure identified
22	R5.3	Failures detected
23	R5.4	Information traited interpreted
24	OS6	Efficient information processing assured
25	R6.1	Efficiency of the treatment system assured
26	R6.2	Information enregistred
27	R6.3	Information collected
28	OS7	Archive information assured
29	R7.1	Security of archived information assured
30	R7.2	Locations of archival information identified

31	R7.3	Supports of archival information identified
32	R7.4	Duration of archival information determined
33	R7.5	Archival information identified
34	OS8	Characterization of the information assured
35	R8.1	Information needs identified
36	R8.2	Information source defined
37	R8.3	Destinations for the information defined

V. CONCLUSION

The complexity of the grain grading system and the important number of the information intervening in its constitution enables to elaborate a systemic method allowing the facilitating of system.

The OOPP method of analysis that we extended was permit to describe the information exchanges between the different elements of grain grading system and to define the different parameters intervening in the constitution of the model. An information matrix associated to this analysis method of grain grading model has allowed to identify the information sources and to determine the relations between the activities, permitting then a grain evaluation and a contribution on the hand, to reduce the conflict or non objectively representatives situations and on the other hand to establish consensual and more objective support.

This kind of analysis enables us to specify the information system in order to elaborate a management and conduct tools of projects; then the development of the data processing supports will be facilitated.

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