A systematic planning for improvements in a program of urban food harvest, using the new configuration of Soft Systems Methodology.

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Abstract: The problem addressed by this article is to combat malnutrition and reducing food waste through the collection and distribution of food that even in perfect conditions of use will be discarded by low commercial value. The objective of this paper is to present an improvement to the process of urban harvest food. To achieve this goal was an action research carried out by using a configuration of Soft Systems Methodology. This methodology has proved to be able to structure the process of gathering information in a scenario with multiple involved, enabling the systematic planning of actions. This procedure was used in a real case, a single unit of a mixed organization that develops, together with similar units in 350 cities met in Brazil, one of the largest programs of sampling and urban distribution of perishable foods, in our country. To this end, collects food donors, sorts them and then distributes in social institutions. Our expectation is that the results of the application will contribute to the dissemination of the model, helping to reduce hunger, a complex social problem.

Keywords: Problem structuring, Soft Systems Methodology, Urban food harvest.

1 Introduction

The possibility of contributing to improvement of a complex social and real program of urban collection and distribution of food is the main motivation for this work. This improvement focused in minimizes food and nutrition insecurity as well as the food waste.

In order to achieve this goal, the structuring the current context and the implementation of a systematic planning were the main objectives.

However, it is expected other contributions such as validation in the Ion Georgiou's (2006) proposal about SSM Methodology on a truly situation and the spread of urban food harvest in order to generate the visibility of humanitarian projects.

The work is presented in sections, the conceptualization of the current situation through problem structuring methodology in operational research is detailed; then the whole stages of Soft Systems Methodology (SSM) is applied; finally the results of this applications are presented as well as the relevant conclusions.

2 Conceptualization

Human decisions occur in the presence of conflicting criteria often difficult to reconcile. So, to help the decision-making processes emerged decision support methodologies, a branch of operations research that is characterized by various analytical methods and principles that will help the participants in a given situation to select the best paths considered decisions especially in complex environments.

2.1 Problem Structuring Methods

The application of Operations Research traditional methods requires that the real problems are modeled mathematically, indicating a goal, constraints and decision variables. The problem is determinate the decision variables to optimize the goal and satisfying the constraints.

On numerous occasions, this is not the case, since the situations are complex issues to address, either because the interests of stakeholders may conflict which does not allow agreements to achieve the goal, the information gathered may be incomplete, may influence not only aspects of numerical analysis, but also ethical, psychological, social, etc., requiring a multidisciplinary approach. To address these situations have arisen in the last 40 years, the problem structuring methods (PSM).

They are characterized by: Incorporate conceptual models that consider subjective aspects; Promote the active participation of all involved; and, encourage their creativity. It can be defined as a systemic intervention (Midgley, 2000).

The three problem structuring methods (PSM), commonly known are: SCA Strategic Choice Approach (John Friend *apud* Rosenhead, 1989), SODA Strategic Options Development and Analysis (Fran Ackerman & Colin Eden, *apud* Rosenhead, 1989) and SSM Soft Systems Methodology (Peter Checkland *apud* Rosenhead, 1989).

2.2 Soft System Methodology

Soft Systems Methodology (SSM) was developed by Peter Checkland in Lancaster University by the 70 years (Rosenhead, 1998).

Soft Systems Methodology (SSM) was developed by Peter Checkland in Lancaster University by the 70 years. Friend realized that hard OR methods were inadequate for complex problems. It took the methodology of traditional systems engineering (hard), and analyzed its transformation to be able to deal with "humanity" of humans, highlighting the importance of creativity, irrationality, and values. (Rosenhead, 1998)

SSM is a learning system that articulates a process of questions that leads to action. It is a process for management. It assumes that different individuals and groups are autonomous, making different ratings, leading to different actions with which the administrator has to deal with, and reacting facing an ever-changing flow of events and ideas.

The SSM features are:

· Applies to management problems.

· Individuals: assumed to be different, make different assessments, leading to different actions. Perceptions and assessments partially overlap.

· System: the concept of a whole which has properties as an emerging entity. In a dynamically interconnected world, explore how the idea of system can be mobilized to help explain the complex reality.

· Works with the complexity of human activity systems, characterized by being listed in a logical one with a purpose. These references are given in terms of a "private interpretation" of each exhibitor, opening multiple possible descriptions. Each one will be based on explicit assumptions about the world, "world view" (the set of images in our heads, put there from the beginning) taken as given. SSM considers the need to describe any human activity system in relation to a particular image of the world. Likewise every action in the real world can be described by different systems of human activity.

· Process information (questions). SSM learns by comparing pure models of purposeful activity with perceptions of what is happening in a real world problem situation.

SSM provides a class of highly explicit comparisons, based on models of systems used in an organized process, which is itself a learning process.

SSM in essence seeks to:

· Describe everything possible about the problem situation on its history, the commitment of assistance, potential problems, the existing culture, power and politics. Expresses this in the form of rich picture;

· Developing systemic models of human activity in order that explicitly incorporate viewpoints or perspectives relevant to the situation;

· Expressed in terms of logically these root definitions and conceptual models of activity;

· Use the templates as a way of questioning and analyzing the situation to structure a debate between the parties on the changes desirable and feasible;

· Search the agreements between the different perspectives or world views about the changes that could make the situation;

It works best if most of the activity was in fact made by the participants of the situation with the OR practitioner acting as a facilitator. It is they who have the detailed knowledge and, finally, must be committed to act.

The purpose of the comparison, in the latter stages of the method, is to achieve the ability to make useful actions in the problem situation in question, the actions defined in the comparison phase (versus the perception of the real world model).

Briefly, SSM involves the following steps:

Steps 1 and 2: Discovering the situation, through three analyses:

Analysis 1: Takes intervention in the situation as his subject and identifies the occupants of the functions: customers, who makes the intervention takes place; solving the problem: who leads the study and owners of the problem, who can stop the activity.

Analysis 2: Observe the problematic situation as a social system. What roles are significant, which are expected standards of conduct. It is to give primary care systems as "culture."

Analysis 3: It examines the political situation: how to get, use or preserve relations of power.

Step 3: Formulating roots definitions (RD)

Write the names of the relevant systems, which allow useful activities. RD must be built by considering the elements CATWOE (clients, actors, transformation process, world view, owner and environmental constraints)

Step 4: Building conceptual models

It consists in joining the verbs that describe activities that must be in the RD and structure them according to logical dependencies. They are activities carried out by the Transformation of the RD. The final model is a system, i.e. an entity that can adapt and survive through processes of communication and control in a changing environment. To do this it must be necessary to add a monitoring and control subsystem, which examines the operations and control the actions to change and / or improved them. It tests effectiveness, efficiency and effectiveness. The construction of the model focuses on RD. What it is seen is a coherent and defensible model, rather than "right." It is obtained a number of models of activity systems, some related hierarchically, each built according to a vision of the world declared in the W of the CATWOE.

Step 5: Comparing the models and reality.

It offers four ways: a) recording the difference b) greater detail, c) operate the system on paper, d) build the model. This step provides the structure and content of a debate organized on how to improve a situation considered problematic.

Step 6: Setting changes

It makes a debate on the possible exchange that for participants, bring potential improvements. These movements have to consider two aspects: being systematically desirable and culturally feasible.

Step 7: Taking actions

When it is identified some transformations accepted as desirable and the cycle is completed with the implementation of these changes, which alter the initial perception, creating a new cycle. It is a management approach with a broad point of view.

The method makes use of systems with significant activities in a combination that is directed not only to facts and logic of a situation, but also the myths and meanings of people associate with the situation and realizes it.

2.3 A new configuration of Soft Systems Methodology

To perform this research was chosen a new configuration of Soft Systems Methodology developed by Ion Georgiou. The author of this one defines "managerial effectiveness" as the ability to answer three questions:

1) How is it possible to extract information from a problematic situation with little knowledge?

2) How can this information be structured in a way that allows a rigorous definition of the problem? And,

3) How this definition can be used to offer a systemic approach to the resolution?

He presents a configuration that allows answering these three questions.

To answer the first question: the production of knowledge, proposes an analysis by three diagrammatic analysis, one focusing on the actors, the two focused on socio-cultural dynamics and three focusing on power dynamics. May be made a rich figure, obtaining as a product a database of organized knowledge. This associated with steps 1 and 2 of the SSM.

To answer the second question: the application of knowledge, he proposes analyses the transformations with the rules of SSM, its contextualization by CATWOE and planned by root definition (Checkland apud Rosenhead, 1989). It is obtained a database of application which is associated with steps 3 and 4 of SSM.

To answer the third question: the planning system, he proposes the control criteria in the planning of individual and integrated systems, using the tools of an individual human activity system and super system respectively, to assess effectiveness, efficiency, effectiveness, ethics and elegance. It is obtained as a product a database of systems and is associated with steps 5, 6 and 7 of SSM.

The proposal is a systemic planning (Midgley, 2000) through a systematic process that allows planning in the short, medium and long term and can serve for modelling dynamic systems.

3 Application of the methodology

In this paper we used the configured version of Soft Systems Methodology Georgiou (2008).

This methodology is intended to achieve three key objectives for the decision maker, to produce knowledge about the context of a problematic situation, to call this application of phase one, use this knowledge to the problem definition, phase two, and plan to systematically action, phase three.

This procedure was used in a real case study in a single unit of a mixed organization that develops, together with similar units in 350 cities met in Brazil, one of the largest programs of sampling and urban distribution of unprocessed foods, in our country. To this end, collects food donors (3,253 partner companies), sorts them and then distributes in social institutions (entities assisted 5399), 18,623,474 kg of food distributed benefiting 1,518,060 people just in the first half of 2011 (SESC, 2011). Thus fosters the social commitment of donors and educational commitment of social institutions.

To understand the operation of the program, was interviewed the coordinator of this unit, initially.

To achieve the first goal, the production of knowledge, Analysis I, Analysis II and Analysis III are used, which can be generated from the production of a rich picture.

In the first interview, was made use of the rich figure to illustrate the current situation, i.e., the authors of this article, the role of facilitators of the process, questioned the program coordinator of a food crop to explain through speaking and writing, which the daily operation, the logistics of a food crop of the relationship, the process of conquest of donors, and the selection of institutions to be met.

This first meeting may take place the first two analyses. In Analysis I, it was identified the actors, that is, everyone involved in the situation, individuals and entities. In the Analysis II, it was identified the socio-cultural dynamics of the problematic context.

After the interpretation of the interview, and compiling the data, the facilitators required a new meeting, where initially took to validate the Analysis I and II, to verify that all the actors and socio-cultural dynamics were listed correctly in this new intervention of the problem, included some missing elements, few, which shows that the figure was rich and informative and helpful understanding of the context.

In this second interview, proceeded to the list of power relations, it was observed that the separation in a new interview helped the process, because the actors defined and listed the issue of power of each relationship was more punctual, making the process clearer fast and the final stage, a fact that helps to save the time of the interview, because as it is a multi-phase approach is of great value does not exhaust him so that he intends to continue the process until the end of all the proposed methodology.

For Phase 2, the application of knowledge, we have three steps.

The Stage I of Phase 2 is to identify the desired transformations, which are what is needed to change the situation that has to a new you want. These transformations were obtained by the knowledge acquired in Phase 1, and validated with the interviewee.

To identify these transformations using the four rules it is spoken by Checkland (1989), they are: consider only one input and one output, the entry must be present in the output but changed; an intangible

or abstract input must result in an output intangible or abstract, a concrete or tangible input must result in a tangible or concrete output.

Stage II, Phase 2 aims to contextualize the transformations, for that makes use of the mnemonic CATWOE, where for each desired transformation, it makes the description of the Customers, who benefits and who loses from this transformation, Actors, who will that this transformation happen, Transformation, the transformation itself; Weltanschauung, which justifies this transformation; Owner (s), who can stop this transformation; Environmental restriction (s), which restrictions are immediately connected to this restriction.

In Stage III, Phase 2, the transformations will be made from the root definitions, which are the basis for continuing with the Phase 3.

As a way of describing the elements of CATWOE for a full understanding, this should be stated in the form of a logical statement, as well known as structured setting root.

Phase 3 will conclude the work in the end we will have a systematic planning of actions to improve the situation existing in the general program of urban food crop studied.

In this last phase the main concern is planning for the future, involves the use of knowledge acquired in two phases to make a better future. If this improvement is small or short-term view is more likely to be fully planned and executed later than normal in the medium and long term.

The procedure for carrying out this phase is: For each transformation must be listed the activities necessary to accomplish it, then it should bind the activities conceptually, then it is stipulated criteria of control. This is called a conceptual model or system of human activity.

While there, the relationship between the transformations, it can establish a connection between them, thus creating a larger system (the super system) and to provide control criteria for this larger system. This super system is the plan of action.

4 Results

The results of application described are shown in this section.

Rich picture, targeted by the program coordinator of urban food harvest studied is displayed (Fig. 1).

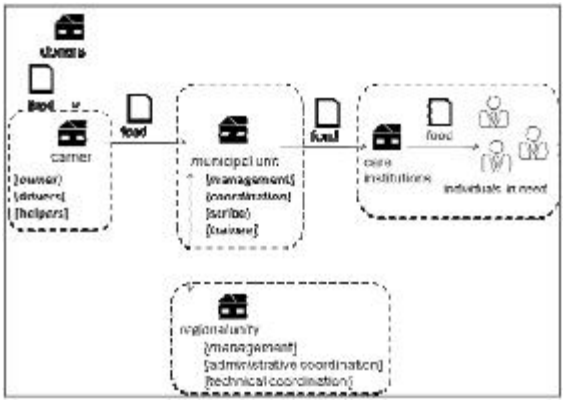

Fig. 1. Rich picture.

The data generated by the analysis I, can be seen:

Table 1. Analysis I, identification of the actors involved in the problematic situation.

People	Institutions
Coordinator / Nutritionist (helper nutritionist and trainee)	Harvest Program
Drivers and driver helpers	Donors (supermarkets, street markets, restaurants, industries, bakeries, grocery stores, coffee shops, rural cooperatives)
People with nutritional needs	Recipient institutions (social institutions caring for children, elderly, drug addicts, pregnant women, adults)
	Regional unit
	Local unit
	Federal government

Analysis II, identification of the dynamics of the socio-cultural context of the problematic situation:
· Model urban harvest;
· Hierarchical structure of power;
· Centralized Organization;
· Activities dependent on the schedules of donors and recipients;
· Legal responsibility on the quality of food;
· Positive image for the realization of social activity;
· Promotion of nutrition education;
· Prioritization of beneficiaries of the majority needed.
The data obtained from Analysis III, can be checked below:

Table 2. Analysis III, identification of power dynamics in the context of the problem situation.

Who?	What power?
Coordinator / Nutritionist (helper nutritionist and trainee)	Dependent on the structure SESC
	Execution of the contract of carriage
	Definition of the daily activities of drivers
	Promoter relationship with donors
	Promoter of the related institutions
	Responsibility for the registration of charities to deliver
	Power of choice for prioritizing needs
	Training for food handlers
	Responsibility for quality control of food
	Administrative management
	Defender of the importance
Drivers and driver´s helpers	Subordinate to the transportation company
	Dependent on the orientation of the program coordinator
	Compliance with local traffic rules
	Responsible for continuous temperature control of the truck
	Responsible for compliance with quality characteristics for acceptance of food collection
	Direct relationship with donors
	Transfer and handling of food
	Direct relation to delivery for charities
	Inform possible waste or bad uses
Relief	Dependent on the promotion of charities
	Main beneficiaries of the program
Harvest Program	Enables the operation of the process of urban harvest
	Promotes the reduction of hunger in the country
	Reduce hidden hunger through the possibility of missing nutrient intake
	Sets an example to other projects of its kind
Donors	Deliver food to the program
	It valued its social image
	Security transparency of the work
	Participate in the sensitization
Recipient institutions	Receive food program (demand)
	Provide food assistance and care to people in social vulnerability

	Participate in educational activities
Local unit	It provides structure for the operation of the program
	Collect monetary resources
	Report progress and experience local
Regional unit	Report overall progress and experience
	Choose the model to be developed
Federal government	Develop laws of transport and food handling
	Liability laws stipulates the donation
	Encourages programs to combat hunger

In stage 1, Phase 2, the SSM approach, we identified the following transformations.

Table 3. Identification of the transformations.

Undesirable state		Desired state
Routing performed monthly by the nutritionist	T1	Facilitating the routing
Waiting list	T2	Expansion of service
Lack of resources	T3	Expansion of resource gathering
Legal impediment to receive processed foods	T4	Legal incentive for donations
Insufficient third-party vehicles	T5	Reverse bureaucracy to have another vehicle
Lack of community involvement	T6	Mobilization and awareness
Concentration of work to the nutritionist	T7	Increased team to division of labor

They were then filled the 'CATWOE' of each transformation, and found the root definitions:

In the following table, are filled in the CATWOE of each transformation, and the definitions derived from the root definition of each:

Table 4. Characterization of the transformations.

Transformation	CATWOE	Root definition
T1	C Customer (s): Nutritionist, drivers, donors and recipient institutions A Actor (s): A consulting contract T Transformation: 'Routing performed monthly by the nutritionist' to 'Facilitating the routing' W Weltanschauung: Speed of execution of tasks, better use of truck capacity and time O Owner (s): Harvest Program E Environment: Monetary resources controlled	A consulting contract-operated system that defines and maintains a facilitating routing to meet the nutritionist, drivers, corporate donors and recipient institutions in accordance with the expectations of the harvest program, in order to ensure speed of execution of tasks, better use of capacity truck and schedules in an environment of controlled monetary resources.
T2	C Customer (s): People needing food in the region A Actor (s): Harvest program T Transformation: 'Waiting list' to 'Expansion of service' W Weltanschauung: Extensive number of people with food deficit O Owner (s): Local unit E Environment: Lack of prioritization of social programs, lack of interest.	A harvest program-operated system that defines and maintains an expansion of service to meet the people needing food in the region in accordance with the expectations of the local unit, in order to ensure extensive number of people with food deficit in an environment of lack of prioritization of social programs, lack of interest.
T3	C Customer (s): Charities, people needing food A Actor (s): Network of donors, nutritionist T Transformation: 'Lack of resources' to 'Expansion of resource gathering' W Weltanschauung: Network of donors can be increased by increasing the dissemination and collection capacity O Owner (s): Harvest Network E Environment: Low collection capacity, low coverage of the disclosure of the program and	A network of donors and nutritionist operated system that defines and maintains a expansion of resource gathering to meet the charities and people needing food in accordance with the expectations of the harvest network, in order to ensure network of donors can be increased by increasing the dissemination and collection capacity in an environment

	benefits generated	of low collection capacity, low coverage of the disclosure of the program and benefits generated.
T4	C Customer (s): Donors, recipients and harvest program A Actor (s): Popular initiative T Transformation: 'Legal impediment to receive processed foods' to 'Legal incentive for donations' W Weltanschauung: Extension of tax deductions by donors O Owner (s): Federal government E Environment: Current Legislation rigid, disinterest	A popular initiative operated system that defines and maintains a legal incentive for donations to meet the donors, recipients and harvest program in accordance with the expectations of the federal government, in order to ensure extension of tax deductions by donors in an environment of current legislation rigid, disinterest.
T5	C Customer (s): Harvest program A Actor (s): Local unit T Transformation: 'Insufficient third-party vehicles' to 'Reverse bureaucracy to have another vehicle' W Weltanschauung: Power to control the transport O Owner (s): Local unit E Environment: Budget control, parking, maintenance	A local unit-operated system that defines and maintains a reverse bureaucracy to have another vehicle to meet the harvest program in accordance with the expectations of the local unit, in order to ensure power to control the transport in an environment of budget control, parking and maintenance.
T6	C Customer (s): Society in general, program A Actor (s): Marketing of the program T Transformation: 'Lack of community involvement' to 'Mobilization and awareness' W Weltanschauung: Involve more people O Owner (s): Local unit E Environment: Social conscience and humanitarian responsibility	A marketing of the harvest food program operated system that defines and maintains a mobilization and awareness to meet the society in general and the program in accordance with the expectations of the local unit, in order to ensure involve more people in an environment of social conscience and humanitarian responsibility.
T7	C Customer (s): Harvest program A Actor (s): Local unit T Transformation: 'Concentration of work to the nutritionist' to 'Increased team to division of labour' W Weltanschauung: Division of labour, much work focused on a single person, limited expandability O Owner (s): Local unit E Environment: Budget control, vision	A local unit-operated system that defines and maintains an increased team to division of labour to meet the harvest program in accordance with the expectations of the Local unit, in order to ensure division of labour, much work focused on a single person, limited expandability in an environment of budget control, vision. Following the work for the last stage, the corresponding actions were listed for the execution of each transformation.

Following the work for the last stage, the corresponding actions were listed for the execution of each transformation.

Table 5. Action listed to be developed.

Transformation	Actions
T1	Review records of donors and recipients Provide criteria for prioritizing and scheduling windows To quote software routing Hiring an expert for making routing software program-specific Make use of training software Adopting new software
T2	Catalog institutions on the waiting list Check prioritization criteria Mobilize action to expand the collection of donations

	Run a better distribution of food obtained
T3	List sources of funds to provide increased resources
	Discover how to get access to responsible
	Studying processes of bureaucracy
	needs to stipulate
	Educate leaders and potential funders about the importance of investment
	Quote values of resources
	Distribute proceeds
T4	Studying the current legislation on food donation
	Find studies already existing and possible proposals on this subject
	Study feasibility of these proposals
	Propose a solution
	Exposing to the bodies responsible
T5	Make an economic comparison between the current system and a system of own fleet
	See what the bureaucracies involved in the request for new trucks
	Using a routing software for planning the number of trucks on the basis of collective
	capacity, capacity of the truck routes and shifts
	Make the budget
	Propose purchase
T6	Studying how to reach people
	See where the availability of agents and prosecutors in the unit out
	Partnering in action
	Donors to promote social responsibility as agents (e.g., seal, reusable bags)
	Promote education and awareness actions
T7	Study the need for staff
	Doing the work schedule
	Divide tasks
	Provide necessary qualification
	See resources for hiring
	Hire
	Train

And finally the product obtained by applying the methodology was the production of seven systemic planning of human activity, each corresponding to a transformation, by way of illustration is in the appendix attached to the design obtained one of the seven transformations, which can be seen all information obtained and that can help the implementation process of transformation, i.e., the root definition, the CATWOE, the list of actions and their control measures and monitoring.

5 Conclusions

The work performed was of great value for testing the methodology in a real application and usefulness to society. Showing it ideal for the development of knowledge gained and systems planning implementation expected. Validating the choice of method to a complementary work, the application being performed with the group involved in urban food crop. Action research provided a real experience, where they could live with the real difficulties of applying the methodology, especially as regards the various steps and stages proposed.

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Appendix