Strategic management model for decision making in agricultural entities. Implementation in a UBPC from Martí municipality (Part I)

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ABSTRACT

This work had as objective the implementation of a strategic management model suitable for supporting decision making in a basic unit of cooperative production (UBPC) in the Martí municipality (Matanzas province, Cuba), specifically the stages of evaluation and identification of relevant indicators, which allowed to visualize the productive entity as a system where the context, inputs, processes and products are evaluated, in a participatory way. In this part of the implementation, the mapping of social actors allowed to identify all the people and organizations that can be critical for the planning, design, implementation or evaluation of the UBPC's strategy. Likewise, a set of 36 relevant indicators for decision making in this UBPC were identified, organized in four dimensions: environmental, social, economic and technical-productive, from them 18 were selected that become a key input to support it. On the other hand, in this scenario the conversion of a specialized cattle milk production system into integrated livestock production-agriculture systems, which enhance nutrient and energy recycling, biodiversity increase and production of environmental services, was started.

Key words: decision making, strategic management, UBPC.

INTRODUCTION

In Cuban agriculture there is little experience in strategic management, in its most integral vision -strategic planning, implementation and control-, which has been demonstrated by such authors as Suárez (2003), Suárez *et al.* (2007) and Delgado (2011), in this sector the direction by annual objectives prevails, combined –sometimes- with strategic planning, with time limits between two and five years, but, their implementation and control are still scarce.

In this context, and although in some agricultural productive organizations strategies have been formulated (Machado *et al.*, 2009, Duquesne, 2011) there is not an organizational, conscious, integral and systematized proceeding (model and associated procedures) yet -in an explicit way- for strategic management, that supports decision making in agricultural organizations in Cuba; in which, necessarily, the basic units of cooperative production (UBPCs) have to be present.

In a previous paper the Strategic Management Model (SMM) for decision making in Cuban agricultural entities, with four stages associated to the CIPP model (context, inputs, processes and products) was introduced, whose objective is to support such process to develop strategic management in the UBPCs and thus contribute to their sustainable development.

This work has as objective the implementation of this SMM in a UBPC from Martí municipality (Matanzas province, Cuba), specifically the stages of evaluation and identification of relevant indicators. From this perspective, the UBPC can be visualized as a system where the context, inputs, processes and products are evaluated.

METHODOLOGY

Chart 1 shows the procedure used in the research, with four sequential stages, in which the selected object was researched. In order to accomplish the

[1] This paper is part of a doctoral thesis.

STAGE 1	
CONTEXT EVALUATION	
Characterization of the UBPC	
Baseline	PARTICIPATORY DIAGNOSIS
Mapping of actors	
Geographic Information System	
(UICN, 1997)	
STAGE 2	
EVALUATION OF INPUTS	
Identification of subsystems	
Selection of the main and complementary subsystems	
Input identification for each subsystem	
Input evaluation	
STAGE 3	
EVALUATION OF PROCESSES	
Training	
Elaboration of the organizational chart	
Identification of processes and sub-processes	
Elaboration of the process map of the enterprise	
Elaboration of the process flow diagram	
STAGE 4	
EVALUATION OF PRODUCTS	
Identification of relevant indicators for decision making	
Selection and evaluation of relevant indicators for decision making	

Chart 1.Graphic representation of the research procedure.

foreseen objectives, the context evaluation (stage 1) was carried out first, in which a participatory diagnosis with the relevant actors of the UBPC was performed; for that purpose methods and tools were used, such as: participatory observation, brainstorm, group work, baseline and mapping of social actors of the UBPC to identify them and know their potentials; the ARPMS[2] methodology (UICN, 1997) for diagnosis and evaluation was also applied.

In the mapping of social actors the methodology elaborated by the Citizen Project (UN-HABITAT, 2001) was used, adjusted to the context evaluated during the research. When elaborating this map, people and institutions associated to the development proposal of the UBPC were identified, and classified based on the characteristics of everyone immersed in decision making regarding their interest and influence.

In stage 2 the evaluation of inputs was made through the methodology suggested by Machado *et al.* (2008); by means of group work the main and complementary subsystems were selected; the available and necessary resources (human, material and financial) were identified and appraised, in each subsystem.

For the process evaluation (stage 3), it started with the training of decision makers through the methodology of participatory action (UICN, 1997); the questions that propitiated reflection and discussion were related to the process and the process map concepts, the way to design a diagram and the management by processes.

The organizational chart of the UBPC was elaborated, with participation of the administration, the management board and the general assembly. The processes and sub-processes of the subsystems were identified through brainstorm and group work; likewise, the process diagrams and process map of the entity were elaborated.

In stage 4 the indicators for decision making were identified, according to studies conducted by Socorro (2001); Campos (2003); Miranda (2006); Machado *et al.* (2007; 2008; 2009); López (2010) and the Center

[2] They are the initials of the Analytical, Reflexive and Participatory Mapping for Sustainability.

of Studies on Cooperative and Community Development –CEDECOM– (2005-2012). The participatory workshops allowed decision makers to choose and evaluate the relevant indicators for decision making in the evaluated UBPC.

RESULTS AND DISCUSSION

For the model implementation the following evaluation stages were agreed upon:

Stage 1. Context evaluation

The baseline was created in a participatory way during 2005; the UBPC had 135 workers, 130 were directly related to production. Its main social object was milk production in an area of 1 351,19 ha.

At the beginning of the research in 2005, the UBPC had economic losses; at this moment the advisory by a multidisciplinary team of the Experimental Station of Pastures and Forages "Indio Hatuey" started, which allowed to improve the economic, environmental and technical-productive indicators. This was achieved from the implementation of conservationist technologies and the productive diversification, which permitted to increase incomes. Likewise, in 2008, the strategic projection was made and an information system for strategic management was created following indications of the Ministry of Economy and Planning, to which the research summarized in this article contributed.

The decisions associated to the agricultural management must be supported by the availability of good information and for that purpose records must be kept, based on the idea of "better management through the perfection of information" (Varming *et al*., 2010). Based on the above-mentioned information and with the support of a geographic information system (GIS) developed through the software ILWIS 3.4, a set of thematic maps was elaborated associated to a database that was created. Figure 1 shows the productive area the UBPC had in 2011, this facilitates a spatial location of the object under study to improve decision making.

As can be observed, there were eigth units in the UBPC. From them the units 43, 44, 47 and 48 were focused on milk production; the unit 46 was dedicated to beef production; the San Juan unit, to calf weaning;

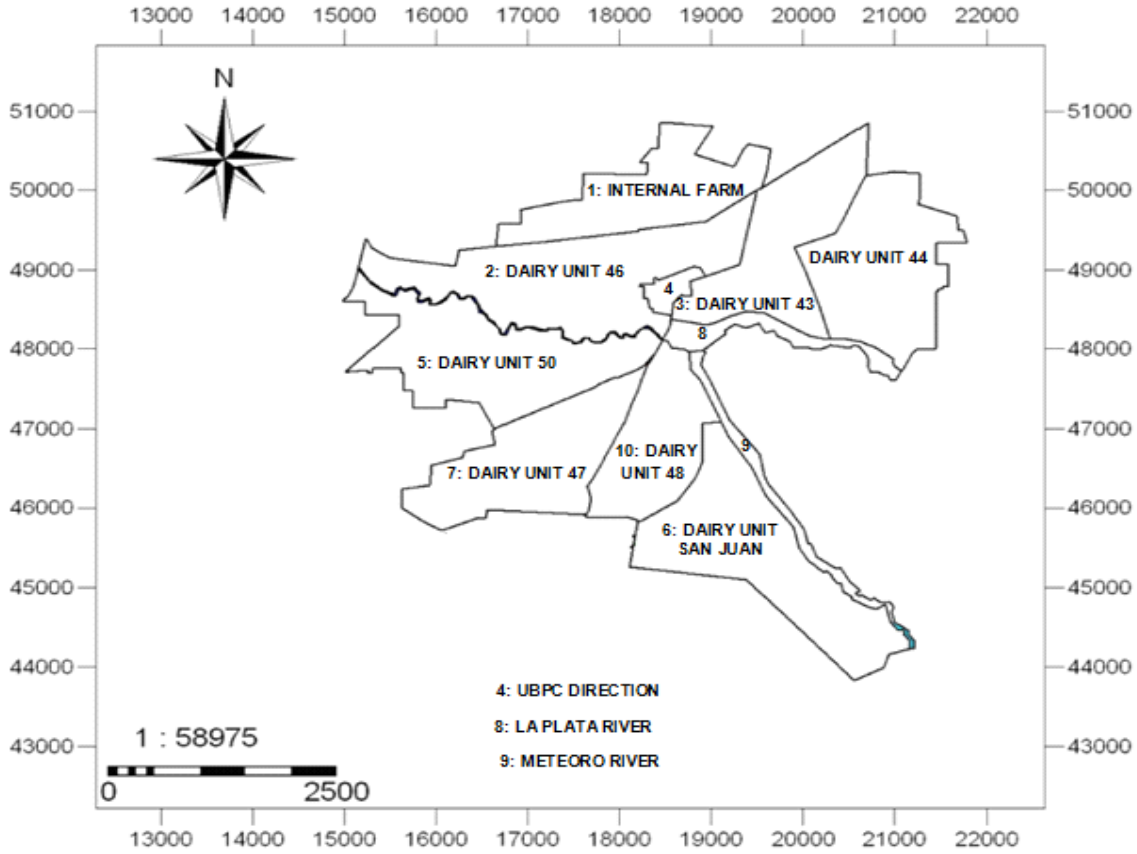

Figure 1. Productive area of the UBPC (Source: Elaborated by the author, through ILWIS).

the unit 50, to the young bulls rusing, as an integral farm to satisfy the demands of fruits and vegetables of the entity, as well as of eggs, pork and mutton for the partners and their families. An organizational structure of work in the productive processes has been generated in order to achieve transformation, recycling, reutilization and reduction of wastes, as well as diversification of the production -favored by this research-, which contributes to the optimization of human and financial resources.

Mapping of social actors of the UBPC

In the mapping of social actors, suitable to identify all the people and organizations that may be important for the planning, design, implementation or evaluation, the methodology of the HABITAT Program (2001) was used, adapted to the context which was evaluated during the research. When making this map the following steps were executed:

Step 1: in a participatory workshop in the UBPC, the objective and importance of mapping the social actors were presented and the reason that turns them into relevant actors was specified.

Step 2: in a brainstorm the people and institutions associated with the development proposal of the UBPC (social actors) were identified, and classified according to the characteristics of everyone involved in decision making regarding their interest and influence.

Step 3: the map of social actors was made through the interest and influence map. This technique allows to organize the actors, according to their interest and their capacity of having incidence on the adoption of the development proposal of the UBPC. Thus, the actors to be given priority in the design of the action plan were identified.

Figure 2 shows the interest and influence map of the social actors associated to the UBPC, in which the names of the identified ones[3] were located. In the UBPC 52 social actors were identified (33 persons and 19 institutions), according to the perception of the interest and influence levels of each one.

In this sense, figure 3 shows that 6 % of the people and 16 % of the identified institutions were located in quadrant A; little efforts should be invested in them due to their little influence and interest. Twelve percent and 5 %, respectively, were located in quadrant B, with little influence and a lot of interest; therefore, they may be actors that require support to mobilize them, that is, to turn them into actors with power; for such reason, the strategy of the UBPC must be aimed, at least, at maintaining them informed about the development program, because they can gain importance throughout the process.

Nine percent of the people and 21 % of the institutions were identified in quadrant C, which corresponds to those who must be kept "satisfied"; because they can be useful as information and opinion

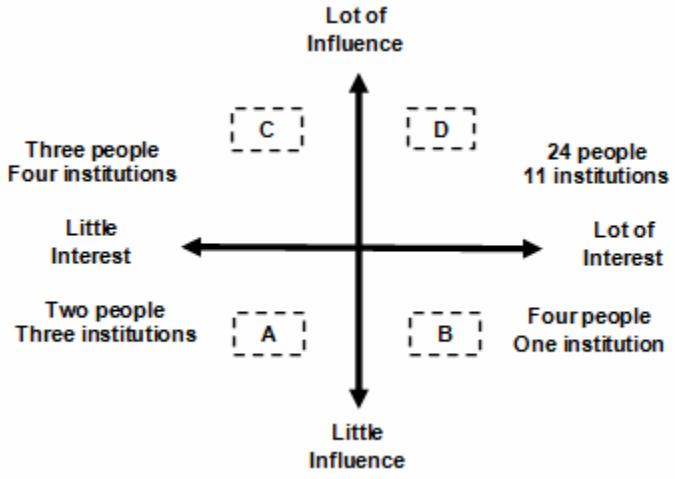

Figure 2. Evaluation of the social actors associated to the UBPC, according to the participants' perceptions (Source: elaborated by the author).

[3] The figure does not show the names in detail, but they were written on a large sheet of paper, during the group session

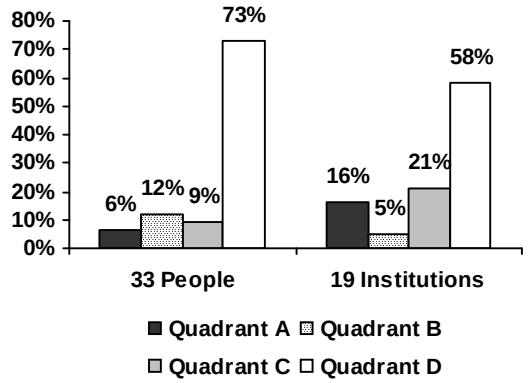

Figure 3. Behavior of the interest and influence levels of the social actors according to the perceptions of the UBPC's decision makers (Source: elaborated by the author).

sources or for helping to mobilize other actors more directly involved (HABITAT Program, 2001). It is important to emphasize that 73 % and 58 % of the actors, respectively, were located in quadrant D, who will be the priority objectives for the UBPC, that is, who could be denominated the "pearls of the crown" and whom they should procure as key allies in their development program.

Stage 2: Evaluation of inputs (input, incomes)

In a participatory workshop, the available resources (human, material and financial) were appraised for each identified subsystem. "Large ruminants" was selected as main subsystem and as complementary subsystems: "small animals", "varied crops", "human talents", "services" and "economy and finances", where the necessary resources (inputs) to develop the processes and outputs, which are the products obtained in each process were identified and evaluated; likewise, it was taking into account which of them constituted strengths and weaknesses.

Stage 3: Evaluation of processes

Also, in a participatory workshop conducted to evaluate the processes, the decision makers were trained in the process management topic. Afterwards, the organizational chart of the UBPC was elaborated together with the administration, the management board and the general assembly; to correctly conduct their activities some departments were organized: human talents, economy and finances, services and the production group of which the process map and diagrams were made.

The production group was structured in three productive systems: 1) varied crops, 2) small animals (sheep, goats, rabbits, poultry and pigs) and 3) large ruminants -the main one- with a group of horses (work animals for the labors in the UBPC), meat production (one unit), milk production (four dairy units) and replacement (five units).

At the beginning of the evaluation the processes and sub-processes were identified in each unit, in order to analyze and plan these productive systems and achieve cleaner productions. Through a team work (brainstorm) the list of processes of the UBPC was obtained and the corresponding activities or sub-processes of each one in particular, which were classified in strategic, operational and supportive, were determined. Finally, the process map of the UBPC was elaborated (fig 4), with the three levels given by the referred classification and the relations obtained in the previous step. The list of the processes and the designed map were presented in the workers' assembly to socialize the results and look for consensus, and that was the preamble to begin the strategic planning.

Afterwards, the process diagrams of the production group were created; according to Beltrán *et al*. (2009), these facilitate the interpretation of the activities, because they allow a visual perception of the flow and sequence of such activities, including the necessary inputs and outputs for the process and its limits.

The residues from the feeding, animal management and milking processes are used to produce compost, humus and organic matter destined to soil improvement in the agricultural and livestock production areas; at the same time, harvest residues (triturated) of the integral farm are used for livestock feeding. Likewise, in the integral farm there are more than 30 species of fruit and timber trees which are intercropped with varied crops, thus achieving greater diversity in the system; on the others hand, land preparation is conducted through animal draught.

The utilization of residues, the intercropping of trees and crops, the agriculture-livestock production integration, diverse agroecological practices and the diversification of animal and plant species, as well as of the production, were encouraged with the contribution of the research, from the establishment of action plans; all this coincides with the information pointed out by diverse authors (Funes-Monzote, 2008, 2009, 2010; Altieri, 2009; Funes-Monzote *et al*., 2009; Altieri and Toledo, 2011; Rosset *et al*., 2011; Altieri *et al*., 2011, Altieri and Funes-Monzote, 2012).

On the other hand, the area of the UBPC is located in the hydrological basin Palma-Meteoro, formed by these two rivers. Therefore, strategies were organized

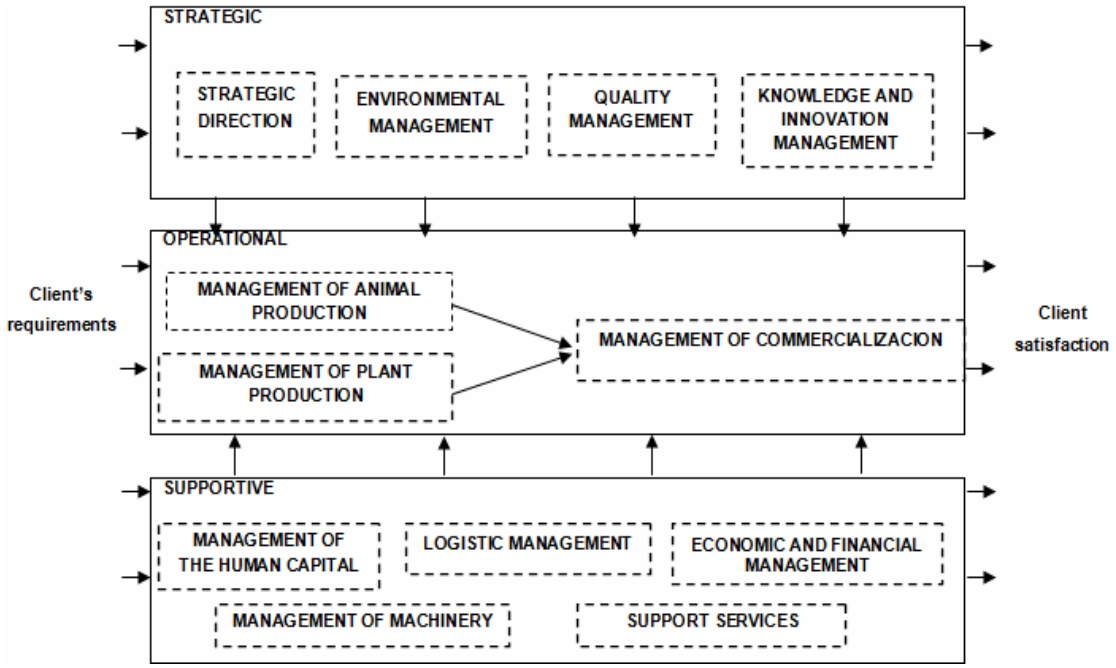

Figure 4. Process map of the UBPC (Source: elaborated by the author).

to optimize the consumption of the water available underground and in the fluvial system of the rivers; with this, an efficient supply of this resource is guaranteed related to the requirements and the regulation of the water regime for animal and plant production, and for other social uses.

Likewise, in the livestock production units the soarces of residues generation are identified, and they receive treatment; all the milking rooms have their oxidation pond, in good conditions, and the harvest and manure residues are used in vermiculture and compost elaboration.

In this scenario the conversion a system specialized in cattle milk production to integrated livestock production-agriculture systems, based on the criteria expressed by Funes-Monzote (2009) was initiated. For that purpose, during the strategic projection new approaches and practices were used that contribute to training, reflection and discussion, to change the way of thinking and acting of decision makers. The adoption of the process of agroecological conversion enhances nutrient and energy recycling, biodiversity increase and production of environmental services.

Stage 4: Evaluation of products

The stage of product evaluation offers the necessary information for making decisions in the UBPC, from relevant indicators that were identified through a brainstorm; for their selection the indicators that reached values from 10 % in the voting were taken into account.

The objective of this stage was to evaluate the products obtained during the research and to conceive an information system for decision making. Likewise, a relationship was established among the different kinds of evaluation and the decision types, allowing to analyze, interpret and judge the results of the entity.

Identification of the relevant indicators for decision making

The indicators constitute a very valuable tool to measure, communicate and facilitate information, which,-according the authors- are an instrument to monitor and evaluate the development process in any scenario, from the perspective of sustainability; as well as to orient the state policies and the processes of decision making at any level, in addition to facilitate relevant information to the society about the main variables and indicators that orient the progress of sustainable development.

The decision makers and partners in the UBPC under study, in the frame of a group work, identified the relevant indicators for decision making, and these were organized in four dimensions: environmental, social, economic and technical-productive.

The participants identified 11 relevant environmental indicators for decision making (fig. 5); afterwards, six were selected: reforestation (22 %), contaminating sources (20 %), deforestation (14 %),

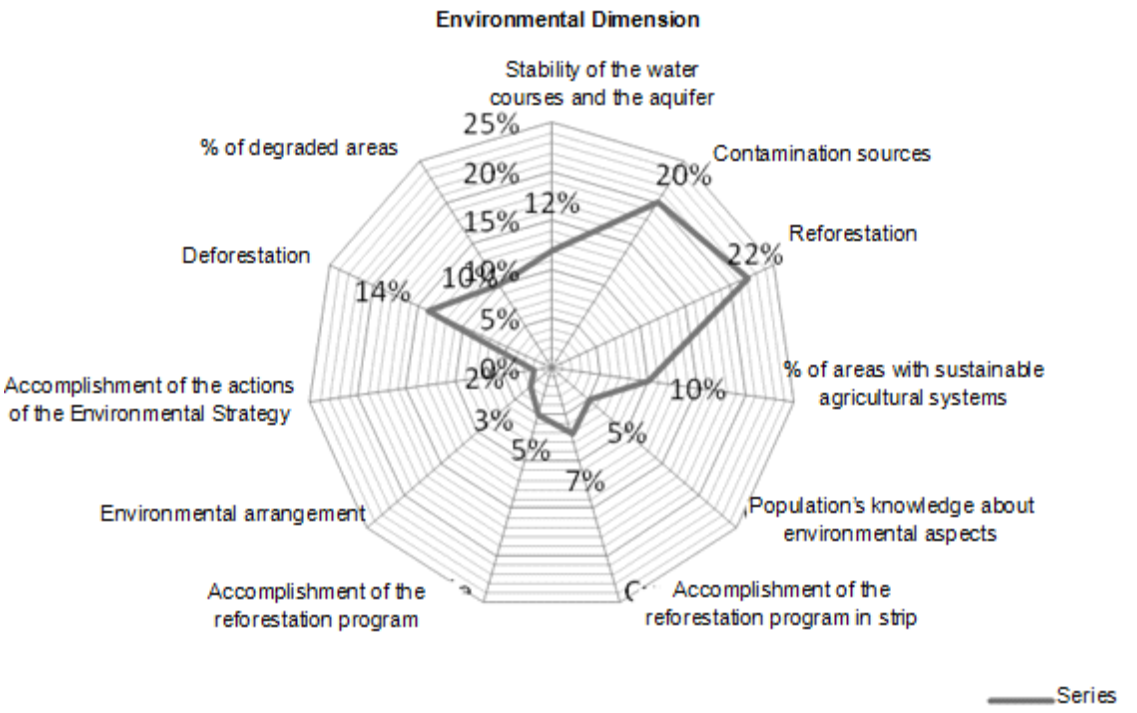

Figure 5. Identification and selection of the environmental indicators for decision making, according to the perceptions of the relevant actors (Source: elaborated by the author).

stability of water courses and the aquifer (12%), percentage of degraded productive areas (10 %) and percentage of productive areas with sustainable agricultural systems (10 %).

In the social dimension (fig. 6) nine indicators were identified and from them four were selected. With higher significance the advance payment was valued (30 %), and it was followed by the percentage of other products to cover the monthly food need (15 %), the percentage of incomes with regards to the food provided by the basic food supply (13 %) and the percentage of housing in good conditions (12 %).

Figure 7 shows the relevant economic indicators for decision making, a total of nine indicators were identified, from which four were selected as the most important ones: average salary per worker (25 %), earnings (22 %), cost per peso (14 %) and productivity (10 %). It is important to point out that although renewable energy sources or energy saving were not chosen, in the workshop there was discussion and reflection about these topics.

As it is shown in figure 8, seven relevant technical-productive indicators for decision making were also identified; afterwards, four were selected: milk production (25 %), liters per cow (20 %), meat production (15 %) and mortality (14 %).

To summarize, a total of 36 relevant indicators for decision making were identified; at the same time 18 were selected, which were grouped with a greater number in the environmental dimension. However, the better perceived and more relevant indicators were: advance payment (30 %), in the social dimension; average salary per worker (25 %), in the economic dimension; and milk production (25 %), in the technical-productive dimension.

CONCLUSIONS

- The implementation of the Strategic Management Model in the UBPC under study, specifically the stages of evaluation and identification of relevant indicators allowed to visualize the productive entity as a system where the context, the inputs, the processes and the products are evaluated.
- The mapping of social actors allowed to identify all the people and organizations that can be given priority for the planning, design, implementation or evaluation of the UBPC's strategy.
- The identification of relevant indicators, grouped in four dimensions (environmental, social, economic and technical-productive), becomes a key input to support decision making.

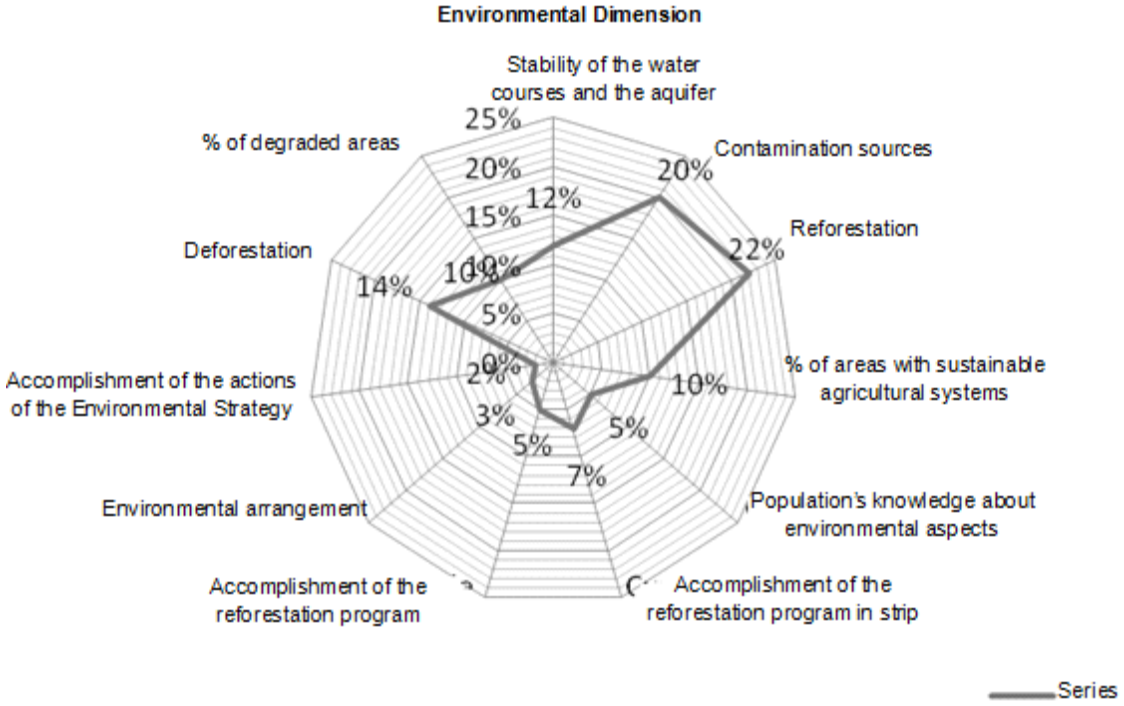

Figure 6. Identification and selection of the social indicators for decision making; according to the perceptions of the relevant actors (Source: elaborated by the author).

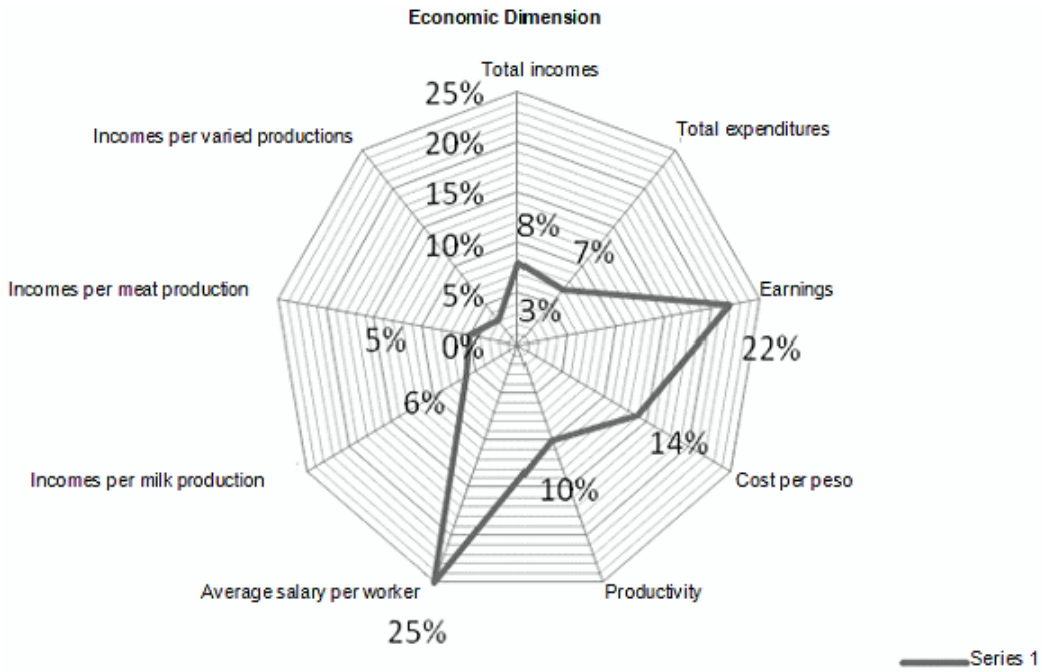

Figure 7. Identification and selection of the economic indicators for decision making according to the perceptions of the relevant actors (Source: elaborated by the author).

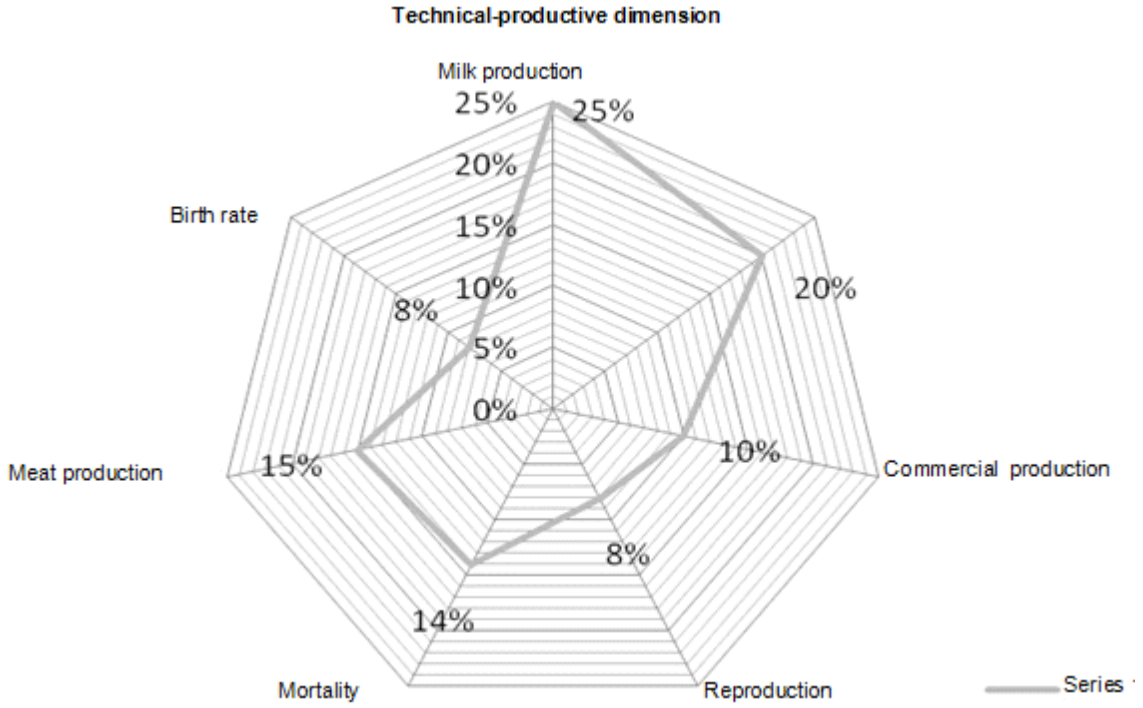

Figure 8. Identification and selection of the technical-productive indicators for decision making, according to the perceptions of the relevant actors (Source: elaborated by the author).

REFERENCIAS BIBLIOGRÁFICAS

Altieri, M.A. 2009. Agroecology, small farms and food sovereignity. *Monthly Review.* 61 (3):102.

Altieri, M.A. & Funes-Monzote, F.R. 2012. The paradox of Cuban agriculture. *Monthly Review.* 63 (8):23.

Altieri, M.A.; Funes-Monzote, F.R. & Petersen, P. 2012. Agroecologically efficient agricultural systems for smallholder farmers: contributions to food sovereignty. *Agron. Sustain. Dev.* 32 (1):1.

Altieri, M.A. & Toledo, V.M. 2011. The agroecological revolution in Latin America. *J. Peasant Stud.* 38:587.

Beltrán, J. *et al* . 2009. Guía para una gestión basada en procesos. Instituto Andaluz de Tecnología e Imprenta Berekintza, Sevilla. 140 p.

Campos, Maybe. 2003. Diagnóstico y evaluación de indicadores locales para la sostenibilidad en ecosistemas de uso ganadero. Tesis presentada en opción al título de Máster en Gestión Ambiental y Protección de los Recursos Naturales. Universidad de Matanzas. Cuba. 100 p.

CEDECOM. 2008. Principales resultados. Centro de Estudios sobre Desarrollo Cooperativo y Comunitario, Universidad de Pinar del Río. Cuba. [Disponible en:] http://cedecom.upr.edu.cu. [9/2/2010]

Delgado, J.C. 2011. Evaluación del nivel de excelencia en empresas ganaderas cubanas. Tesis en opción al título de Máster en Administración de Empresas. Universidad de Matanzas, Cuba.

Duquesne, P. 2011. Uso de la planificación estratégica participativa en cooperativas de la provincia Cienfuegos, como una contribución a la sostenibilidad. Tesis en opción al título de Máster en Ciencias en Pastos y Forrajes. EEPF "Indio Hatuey", Matanzas, Cuba. 107 p.

Funes-Monzote, F.R. 2008. Farming like we're here to stay. The mixed farming alternative for Cuba. PhD Dissertation. Wageningen University, Netherlands. 211 p.

Funes-Monzote, F.R. 2009. Agricultura con futuro. La alternativa agroecológica para Cuba. EEPF "Indio Hatuey". Matanzas, Cuba. 176 p.

Funes-Monzote, F.R. 2010. The conversion towards sustainable agriculture in Cuba: A national scale experiment. In: Conversion to sustainable agriculture: principles, processes and practices. (Eds. S.R. Gliessman and M. Rosemeyer). CRC Press. Boca Raton, Florida. p. 205.

Funes-Monzote, F.R. *et al* . 2009. Agro-ecological indicators (AEIs) for dairy and mixed farming systems classification: identifying alternatives for the Cuban livestock sector. *J. Sustain. Agric.* 33 (4):435.

López, A. 2010. Sistema Integrado de Gestión para las UBPC. Tesis en opción al grado científico de Doctor en Ciencias Económicas. Universidad de La Habana. 125 p.

Machado, Hilda *et al* . 2007. Gestión del desarrollo local en los municipios: la iniciativa municipal como experiencia de cambio en la provincia de Matanzas. *Pastos y Forrajes.* 30:45.

Machado, Hilda *et al*. 2008. Metodología para el diagnóstico participativo y la planificación estratégica en municipios rurales y entidades productivas y de servicios. EEPF "Indio Hatuey", Matanzas, Cuba.

Machado; Hilda *et al*. 2009. Rehabilitación de las UBPC como organización socialista de producción: estrategia de desarrollo agropecuario en Matanzas, Cuba. *Pastos y Forrajes.* 32:1.

Miranda, Taymer. 2006. Evaluación de sostenibilidad. Estudio de caso en una UBPC ganadera. Tesis en opción al título de Máster en Gestión y Desarrollo de Cooperativas. Facultad Latinoamericana de Ciencias Sociales (FLACSO). Universidad de La Habana. 100 p.

Rosset, P.; Machín, B.; Roque, A.M. & Ávila, D.R. 2011. The campesino-to-campesino agroecology movement of ANAP in Cuba. *J. Peasant Stud.* 38:161.

Socorro, A.R.; 2001. Indicadores de la sostenibilidad de la gestión agraria en el territorio de la provincia de Cienfuegos. Tesis presentada en opción al grado científico de Doctor en Ciencias Agrícolas. Universidad Agraria de La Habana "Fructuoso Rodríguez Pérez". 100 p.

Suárez, J. 2003. Modelo general y procedimientos de apoyo a la toma de decisiones para desarrollar la gestión de la tecnología y de la innovación en empresas ganaderas cubanas. Tesis en opción al grado de Doctor en Ciencias Técnicas. Universidad Central "Marta Abreu" de Las Villas. Santa Clara, Cuba. 100 p.

Suárez, J.; Albisu, J.M.; Sotolongo, Naicy & Blanco, F. 2007. Factores de éxito y fracaso en el comportamiento innovador de las empresas ganaderas cubanas. *Pastos y Forrajes.* 30:381.

UN-HABITAT . 2001. Tools to support participatory urban decision making. Urban Governance Toolkit Series. UN-HABITAT. 150 p. [Disponible en:] http://www.unhabitat.org/cdrom/governance/start.htm. [14/2/2011]

Unión Internacional para la Conservación de la Naturaleza (UICN). 1997. Un enfoque para la evaluación del progreso hacia la sostenibilidad. Serie Herramientas y Capacitación. IDRC-CRDI. Ottawa, Canadá. 92 p.

Varming, M.; Seeberg-Elverfeldt, Christina & Tapio-Biström, Marja L. 2010. Agriculture, forestry and other land use mitigation project database. FAO. Rome. 28 p.

Received: October 11, 2012
Accepted: December 19, 2012