

Capacities S-LCA and Participative Score Matrix (P.S.M.)

Michel Garrabé¹, Charles Gillet², Denis Loeillet³, Pauline Feschet⁴

¹ *Faculté de sciences économiques, UM1-Economie ART-Dev UMR 5281, Montpellier (France)*

² *CEP/Epsil'Hôm, Montpellier (France)*

³ *CIRAD, UR Systèmes de culture bananier plantains ananas, Montpellier (France)*

⁴ *INRA, UMR LAE Nancy-Colmar (France)*

1. Context and scope

Assessing the impacts of local productive sectors development needs consideration of the production chain (goods or services) as a strategic territorial policy. Impact estimation requires specific measurement instruments can be provided by S-LCA based on capacities.

However, such a perspective, the question of the identification of local priorities as multi impact indicators remains. The participative collection of priorities (into categories and sub-categories) and their relative weights, allowing the characteriation of the value of results obtained from local development program, is already possible due to the existence of a method developed by the “Centre d’Etudes de Projets” (CEP) : the Participative Score Matrix.

Our ambition is to propose a new version of this instrument by combining our estimation of potential capacity changes as a measure of stakeholders’ impacts, with requirement for provision of participative local aims indicators. Thus, we could provide policy makers with a synthesis of results, in the form of a “capability score” to allow discussion and comparison of alternative options. This would then be a simple indicator gathering many estimations of qualitative and quantitative changes in affected stakeholders potential capacity.

2. Principles

General principle of S-LCA capacity

The principle of capacity S-LCA is to articulate a value chain analysis, with a multiple capital approach, retaining only five capital classes (technical, human, social and

institutional), but excluding natural capital, in order to measure capacity changes of stakeholders performance as affected by social business practices. It is not a behavioural performance of social or societal responsibility corporate measure, but an estimation of real or potential capacities stakeholders' impacts.

The aim is to provide indicators to measure the impact of corporate action (for each level of the production chain, for each type of actor and for each form of capital) on individual endowments as additional capacity operating transformation.

The nature of estimated impact In S-LCA capacity results from a systematic process to identify and estimate effective changes in stakeholders impacted potential capacity, due to the development of a production chain. From this point of view, the nature of complex context, and its role, are subject to special methodological reflection. A context is a situation characterized by a specific accumulation of different types of capital forms, at a given time (t) in a given location (y), for given actors (n). The advantage of this approach is to allow the combination, through a multi-capital development model, of identification and of evaluation of multi-stakeholder impacts requirements,.

In this process, we differentiate a marginal effect of potential capacity and an effect of real capacity. For example, in the case of training course, associated with production, it will be a potential capacity effects conditions indicator. The acquisition of knowledge (if any), becomes a potential capacity marginal possible effect. When marginal knowledge becomes a proven competence then it is a potential capacity marginal effective effect. Finally, the use of this competence, and its capacity to increase productivity or marginal production, will be a net marginal effect of real capacity.

From this point of view, a marginal real capacity effect is a wellbeing effect, which is not to be confused with a simple variation of income. A potential capacity marginal effective effect, however, does not become always a real productivity effect. To make this possible, some technical and institutional conditions must exist, such as provision of equipment, employee working conditions, or existence of relevant rules. Generally, S-LCA performance selected indicators, (in terms of human and social capital) are only potential capacity effects «conditions» indicators in capacities S-LCA, not potential capacity marginal effect and even less net marginal effect of real capacity.

The introduction of a multiple capital approach, in corporate micro accounting, allows the improvement of strategy design. This approach also renews the conditions of an expanded National Accounts (Aglietta, 2011). It's the same, for S-LCA, whose goal is to identify the consequences of additional production provision, in economic, human, social and institutional specific environment. Marginal transformation of the economic and social space is analyzed as a modification of its present and future conditions of sustainable development, that is to say, all of its production and accumulation capacities.

The implementation of S-LCA presents the following phases:

- Identification of classes and subclasses capital,
- Identification of potential capacity effects classes,
- Identification of potential capacity effects conditions indicators,
- Identification and collection of internal information,
- Identification and collection of external information,
- Diagnosis of effects of potential capacity variations,
- Estimated variations of potential capacity effects (effective or potential capacity marginal effects),
- Change analysis of potential capacity effects to real capacity effects.

On indicators, it is necessary to identify the main effects categories generated by each subclasses of capital. In this case, the context is the real relevant identification guide. We propose for selected subclasses capital, categories of effects generally expected of action concerned by this type of capital (for all classes of capital: Garrabé et al., 2013 and H. Yildirim, 2013). It is a set of generic categories, which can be discussed and validated by a control group of actors and organizations. These categories may also change over time to reflect societal priorities.

Data gathered by an INTERNAL survey (in the company) allow the identification of actions performed but not their impacts. How these actions become impacts, requires multiple detailed information from different actors, who are being study. Given the difficulty of obtaining this information, we choose to use:

- additional ad hoc surveys,
- external available studies (local or transferable data),
- as well as expert interviews. The use of expertise may be needed at both the collection of information and the interpretation of results.

The objective of an EXTERNAL survey allowing comparable internal information quality is not sufficient to decide on a capacity marginal potential variation of impacted stakeholders.

That explains the potential capacity variation as an interaction between «social» actions of the company and the multi-stakeholders context impacted.

Principle of Multiple Capital Participative (M.C.P.) Score Matrix

The aim of a Matrix Score is the need to have a participative tool for measuring local action impacts. It allows to taking into account the relative weight of different actors priorities. It looks like a table with three reading levels and two levels of participation. Participation between technical experts who hold expertise and political actors, social values keepers, aims to take into account different conceptions about the same question. Each member is required to play a clearly previously defined role.

Political actors define the framework within which the project will be evaluated. This framework is based on the definition and weighting of criteria and sub-criteria:

- By construction, criteria are predefined and correspond to a specific form of capital. In this hierarchy, the function of elected officials is to assign a political value to each form of capital, on condition that the sum of the weights for each form of capital must equal 100%.
- The choice of sub-criteria belongs to politicians, even if they must rely on technical stakeholders to ensure the existence of these items. The central role of politicians is to assign a weight to each criterion in knowing that, for each item, the sum of the weights must equal 100%.

Technical actors must determine, factually and rationally, quantitative estimation of values for actor's sub criteria chosen by political stakeholders. This expertise must mobilize competent human resources and adequate technical resources. By the nature of the multi criteria Score Matrix, information can be monetary or technical. The observed values are indicated on a rating scale, initially defined by technical operators. The scale used is specific to each sub criterion. For each of these scales, acceptable values can be positive, negative or zero.

Expertise leads to a restatement of the gross rating obtained. First, it is necessary to define an equivalent value of the raw score, to insert the latter to a 0 to 100 units scale. Each adjusted mark on a 100 base is, then, multiplied by the associated weighting in policy sub criterion. Finally, for each criterion, ie for each selected type of capital, the criterion value is obtained by adding up the weighted sub criteria values. Ultimately, we get the value of the weighted criterion, by multiplying the value of the criterion by its political weight. The third level of reading the score matrix is the final score for the project studied. The score is the sum of the values of the five weighted criteria. By construction, this score is always between 0 and 100. Particularity of this score is to take account both of political weight and of technical expertise of all stakeholders who have to decide on the acceptability of the project.

Development of a Score Matrix requires a detailed inventory of each capital type sub-criteria. The selected components can be provided from either technical expertise of technical actors or values supported by politicians, or even, as a result of a mix between these two sources. It is very important that the selected sub-criteria are subject to consensus among all stakeholders to ensure the acceptability and quality of the analysis. Mostly, this work presents no particular problem, because the definition of each type of capital is quite explicit. Selected sub criteria are components which contribute significantly to each different form of capital identity.

The Score Matrix allows the determination of the project contribution by measuring the difference between the score with and without the project. This technique also allows estimating the positive real effect of the project by comparing the value of the estimate and the value of the project score. The higher the ratio $\Delta \text{rating} / \text{score}$, the more the contribution the project compared to the baseline is important.

In both cases, the score matrix is a tool of knowledge production for the organization that implements it. Indeed, after making the early measurements, it is possible to follow in real time the effects of the project and compare them with initial estimates. These feedbacks increase the technicians and policy makers' knowledge of problems area, and puts the organization that leads it, in a continuous improvement participative dynamic position.

Capacities S-LCA et P.S.M. articulation

The aim here is to translate the results of a capacities S-LCA, in a decision tool to estimate relative (multi-actor and multi-capital) qualitative and quantitative impacts, of a local development project on different levels of an existing local chain of activities, taking into account multiple objectives and different priorities

From a project development within an existing local chain of activities, a capacities S-LCA is performed according to the protocol (See § "The implementation of S-LCA presents the following phases"), to assess its efficiency in terms of impacts on multi-actor and multi capital (compared to another project or relative to doing nothing). Changes in capacity of different actors affected, estimated by specific capacities S-LCA indicators (Garrabé et al., 2013), are then translated as scores, estimating the overall importance of capacity changes, by level of subclasses capital.

Because logics of actors are expressed by priorities and different weights objectives, each subclass of capital is affected by specific coefficients (as we mentioned in Section 3). Scores of capacity variations can be calibrated from 1 to n, depending on the level of accuracy. It is not necessary that these scores are the same for all subclasses of capital. The readability of the matrix, but also the quality of the mobilized information, required for high value of n, that are usually, the value is between 5 and 10.

Scoring is always a delicate phase in an available information translation-reduction methodology. This phase of the method must be performed by an expert. All others phases involve policymakers or calculation spreadsheet. In the capacity LCA-S, around one hundred categories of potential capacity possible variations is estimated, which indicators are mixed (qualitative / quantitative, monetary / no monetary, etc.). This information is then grouped in a table in which each cell displays the estimated total, readability of the table being ensured by the use of a color process (Régnier abacus). The capacities score (See § "Political actors" and "Technical actors") is usually 6X9 matrix. It must therefore concentrate the available information without degrading it.

Classes of capital (A)	Share of capital classes (B)	Subclasses of capital (C)	Weighting of subclasses (D)	Score (1...n) of capacities change (E)	Values of capacities change (F)	Capacities weighting values (G)	Total values of capacities (H)	Capacities of change value of weighting classes (I)			
	Decision makers	Decision makers	Decision makers	Site investigations	Estimate (E/nx100)	Estimate (FxD)	Estimate (Total G)	Estimate (HxB)			
Human	40%	Training	15%	2	40	6	36	14.4			
		Working conditions	25%	-2	-40	-10					
		Health	20%	3	60	12					
		Security	20%	3	60	12					
		Parity (men/women)	20%	4	80	16					
Technical	20%	Companies	30%	5	100	30	74	14.8			
		Infrastructure	15%	3	60	9					
		Information	15%	3	60	9					
		Market	25%	4	80	20					
		Public administrations	15%	2	40	6					
		Grant	20%	2	40	8					
Financial	15%	Equity	20%	2	40	8	40	6			
		Investment	20%	1	20	4					
		Credit	20%	3	60	12					
		Induced effects	20%	2	40	8					
		Justice	30%	1	20	6					
Social	15%	Participation	30%	1	20	6	25	3.75			
		Confidence / trust	15%	1	20	3					
		Social integration	15%	2	40	6					
		Social networks	10%	2	40	4					
		Property / ownership	20%	2	40	8					
		Competition	20%	3	60	12					
Institutional	10%	Contracts / agreements	20%	1	20	4	44	4.4			
		Social dispute	20%	2	40	8					
		Norms / labelling	20%	3	60	12					
SCORE OF CAPACITIES CHANGE: between -100 and +100											
								43.35			

References

- Aglietta M. (2011). " Croissance durable : mesurons nous bien le défi ? ", Revue d'Économie du Développement 2011/2 - Vol. 25 (199 to 250).
- Feschet P., Macombe C., Garrabé M., Loeillet D., Rolo Saez, A. Benhmad F. (2012). " Social impact assessment in LCA using the Preston pathway The case of banana industry ", International Journal of Life Cycle Assessment, DOI 10.1007/s11367-012-0490-z
- Feschet P. (2014). " Analyse du cycle de vie sociale : pour un nouveau cadre conceptuel et théorique ", Thèse de l'Université de Montpellier (380 p).
- Garrabé M., Feschet P., Gillet C., Loeillet D. (2013). " Méthode de l'ACV-S des capacités ". Communication Séminaire international en ACV sociale Montréal (Québec) 5-6 Mai 2013. (53p). <http://www.michel.garrabe.com>
- Garrabé M., Feschet P. (2014). " A specific case : Capacities social LCA ", Social LCAs – Socio-economic effects in value chains, Chapter 5 (p 87 to 117). Fruitrop Thema Montpellier.
- Gillet C., Garrabé M., Ricard J. (2014). " Un instrument territorial d'aide à la décision : la matrice score " (à paraître R.E.M. Décembre 2014).
- IDD Québec (2009). " Les indicateurs de développement durable ", Document de consultation publique (2009 Modifié le 12 juin 2009) <http://www.mddep.gouv.qc.ca/developpement/indicateurs/index.htm>
- Industrie Canada (1997). " La mesure du développement durable : étude des pratiques en vigueur ". Document hors série Ottawa (Canada).
- Monet (2009). " Mesurer le développement durable ", Les indicateurs présentés selon les 12 thèmes du système Confédération Suisse Office fédéral de la statistique <http://www.bfs.admin.ch/bfs/portal/fr/index/themen/21/02/01.html>
- Sen A.K. (2010). " Un nouveau modèle économique : développement, justice, liberté ", Paris O. Jacob.
- Stiglitz J., Sen A.K., Fitoussi J.P. (2009). " Rapport de la Commission sur la mesure des performances économiques et du progrès social ", 324 p, Paris Documentation Française.
- Yildirim H. (2013). " Analyse sociale du cycle de vie de la tomate transformée exportée de la Turquie vers la France ", Thèse Master of Science IAMM-UM1 Juin 2013.