Analysis of social performance of the industrial tomatoes food chain in Algeria

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Abstract

The social life cycle assessment approach is used to measure the social performance of companies, using the rules of international labor as a reference. Our purpose is to measure the social performance of sub-sectors of the industrial tomatoes food chain in Algeria. Among the different currents of this approach, the method of attributes was adopted. The system boundaries include a nursery, 150 farms and the biggest cannery of the country. The working conditions are clearly in favour of the cannery and the nursery. At farm level, the hard and precarious work, the absence of social protection and the impossibility to constitute or join a trade union, as well as child labour, determine low social performance. There is a mismatch between the labor time needed at each stage of production and the value assigned to each of these steps.

***Keywords**: social life cycle, tomato, employment, Algeria.*

Résumé

La démarche d'analyse sociale de cycle de vie sert à mesurer la performance sociale des entreprises au regard des règles internationales du travail. Notre objectif est précisément de mesurer les performances sociales des sous secteurs d'activités de la filière tomates industrielles en Algérie. Parmi les divers courants de cette démarche, nous avons adopté la méthode des attributs. Le périmètre de notre système inclut une pépinière, 150 exploitations agricoles et une conserverie. Les conditions de travail sont très favorables à la conserverie et à la pépinière. Au niveau des exploitations agricoles, la pénibilité du travail, la précarité du poste, l'absence de toute protection sociale et l'impossibilité de se constituer en syndicat, le fort emploi des enfants, engendrent une faible performance sociale. Il y a inadéquation entre le temps de travail nécessaire à chaque stade de la production et la valeur attribuée à chacune de ces étapes.

Mots-clé: Analyse cycle de vie sociale, tomate, travail, Algérie.

Introduction

While attempting to improve their economic and environmental performances, some companies are nonetheless exacerbating social issues such as the health and well-being of their employees. To remedy this situation, ISO 26000 is becoming the reference point in terms of corporate social strategy. This "standard" takes the form of recommendations aimed at encouraging organisations to assume their social responsibilities which include good governance, compliance with human rights, satisfactory working conditions, respect for the environment, fair practices, consumer satisfaction and a contribution to sustainable development (Capron and Quairel-Lanoizelee, 2010). According to Capron, an organisation which follows the guidelines of ISO 26000 contributes to local development within its zone of activity by generating wealth and income, creating jobs and participating in education and culture. Making a commitment to social responsibility means contributing to the sustainable development, health and well-being of society (Capron and Quairel-Lanoizelee, 2010). Social responsibility obliges companies to incorporate social and environmental concerns in their economic considerations (Chaigneau, 2010). Social responsibility represents an advantage not only from the ethic point of view, but also from the economic one, as it responds to consumer's concerns regarding production conditions, namely social conditions. This is particularly true in Europe, where a debate concerning Companies' Social Responsibility is growing, in order to create an ethic link between brand, product and consumer. The final goal is value creation. This process anticipates what will sooner or later be an international regulation, just as the environmental labeling displayed on products. Several international labour laws defined by ILO concerning principles and basic rights already exist, among which some have been ratified by developing countries.

Law N° 90-11 of the 21st of April 1990 (complemented on January 11, 1997), regulates working conditions: 40 hours of work in 5 days, less if the conditions are harsh; agricultural work is fixed at maximum 1800 hours per year (art. 24), maximum 12 hours per day (art. 26), child labour (under 16 years of age) is illegal (art. 15), a minimum wage (SNMG), a very good social security coverage and hygiene and safety rules (law N° 88-07 of the 26th of January 1988). However, private companies don't often register their employees and labour inspectors don't control and punish who breaks the law, although they have the legal power needed. Therefore, the problem is not a question of lack of legislation, but the failure in applying and controlling it.

Nevertheless, some private companies take initiatives and believe that good economic performance and good work conditions go together. An example is represented by CAB (Conserveries Amor Benamor), leader in fruit and vegetable processing and, generally speaking, leader of the A-

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gro-food business in Algeria. Part of the Benamor group, this company employs 600 people and is highly concerned with its reputation, in order to maintain its leadership. As regards double-concentrated tomato paste, CAB is the undiscussed leader, as it covers 53% of the national demand of the above product. The company's behaviour could therefore serve as an example for other companies in the sector.

But is this pro-social image actually true all along the different activities carried out by the company for the production of double concentrated tomato paste? The CAB Company has actually applied an integrated approach which covers all the activities from plant production, to agricultural production, and processing. The aim of this article is to analyse the social performance of the above activities by applying an LCA approach to the most important Algerian industrial company in this sector.

1. The social life cycle analysis approaches

The life cycle analysis of a product brings together the three elements of sustainable development (Parent, 2009), whose tools are the following three assessment methods: "environmental life cycle analysis (LCA), social life cycle analysis (SLCA) and the life cycle cost analysis (LCCA)". International research efforts are currently focused on the social analysis. After more than fifteen years of exploring the integration of social aspects in the LCA, a methodological framework has now been more clearly defined with the publication of the SLCA guidelines (2009) drawing on the "life cycle" initiative within the United Nations Environment Programme (PNUE/SETAC, 2009) and the Society of Environmental Toxicology and Chemistry (Parent, 2009).

The SLCA provides decision-makers with a tool intended not only to make companies more responsible but also to provide consumers with acceptable products from the ethic point of view. It also serves to minimize the delocalisation of the workforce from a country where the laws governing working conditions and human rights are more stringent to a country where these laws are non-existent or insufficient (Parent, 2009). Dreyer *et al.*, (2009) view fundamental workers' rights as the main issue to be handled together with the promotion and protection of human dignity and well-being. The social performances of a company are determined by its behaviour towards its stakeholders and this can vary considerably between two very similar companies using the same technologies and operating in the same region.

The aim of the SLCA is to support the decisions taken by companies wishing to incorporate these social aspects into their corporate strategies by providing them with information concerning the social performances throughout the life cycle of a product – " from cradle to grave" – and at each stage of this life cycle. Unlike the environmental LCA which uses quantitative indicators, the SLCA poses a problem resulting from the complexity of its indicators, as most of them are qualitative, difficult to document and with few references to standards. These include, for example, the violation of international labour law including child labour, discrimination, freedom of assembly and the right to collective bargaining, forced labour, etc. So much of this information is kept secret by those companies which do not comply with international laws. Dreyer *et al.*, (2006), divides indicators into those which are obligatory and those which are normative, expressing the needs and expectations for good corporate management. These categories of indicators must be based on the rules established by the International Labour Organisation (ILO 1930, 1948, 1949, 1951, 1957, 1958, 1973 and 1999); they are considered essential and are taken into account by numerous authors (Griesshammer *et al.*, 2005). These indicators relate to forced labour, discrimination, the restriction of freedom of expression and child labour. These criteria are obligatory. Normative considerations vary according to the context; ISO 26000 nevertheless tends to formalize these social standards.

With regard to methodology, several researchers such as Klöpffer and Renner (2008), Hunkeler (2006), Dreyer *et al*. (2006), Kruse *et al.* (2009), Parent (2009), and the CIRAIG-UQAM Canadian team, have developed the attributes method. This approach consists in recording, at each stage of the production chain, social impact indexes by using indicators. Andrews *et al*., (2009) has used the same methodology as Norris (2006) to analyse social impacts generated by Quebec greenhouse tomato production's life cycle. Thanks to such methodology, he calculated each attribute's contribution to the process. These indicators are total work hours and total added value per production unit. Klöpffer and Renner (2008) emphasize the fact that to assess the sustainability of products, all the impacts must be quantitatively linked to a functional unit, for example the percentage of hours worked by children to produce one kilogram of fresh tomatoes.

Hutchins and Sutherland (2008) used another methodology called "pathways" to measure social sustainability and responsibility of a procurement company made up by several Mexican business enterprises. According to the authors, the sustainability of the whole procurement company depends on the sustainability of each individual business enterprise. To measure the latter, the authors followed an input-output model for the following flows: physical substance, human resources, information sources and financial resources. Then they measured changes in human health, security, equity and finally employee's quality of life. The pathways LCA, also referred to as "end point" LCA, evaluates the expected long-term effect of an activity and establishes cause-effect relations, knowing that the aim is to contribute to human well being. Job creation is not normally considered an objective in itself, but by contributing to household income, poverty reduction and thus improved health conditions of the family, it can be considered an end point. Both types of indicator (job creation and health sta-

tus) are, in principle, linked by a "pathway" describing the relationship of cause and effect between the mid-point and the end point, but this relationship is often difficult to explain (Jørgensen *et al.*, 2008).

Differently, Dreyer *et al*. (2006) believe that in order to measure the activities of a product's life cycle which include a great number of employees and several hours of work, everything must be related to and expressed as one functional unit. The authors highlight the creation of value, by applying a monetary analysis to the company's inputs and outputs. Main findings of their study are: (i) social impacts on employees are naturally linked to the company's governance and management, rather than the process itself; (ii) the production system boundaries go beyond the production chain and must integrate the company's sphere of influence; (iii) areas of protection, such as human dignity and wellbeing have been defined and used for the mathematical modeling of the impacts; (iv) The Universal Declaration of Human Rights and the ILO are the reference for social LCA's development. Performance indicators are therefore limited to: forced labour, discrimination, child labour, freedom of association and collective negotiation.

2. Methodology

We have adopted the attributes method to obtain an exploratory measurement of the social performances of the processed tomato value chain in Algeria, as the indicators are clearly defined and refer to international labour law. We feel that it is important to fill the scientific void concerning these elements in Algeria. Following Kruse *et al*. (2009), Dreyer *et al.* (2006) and Andrews *et al.* (2009) we took the following indicators into account*:* the age of the employees, the workforces (in particular women and children), the working conditions, working hours, industrial accidents, social security and the distance between home and the place of work, freedom of association. The scope of our system includes all the activities of the canning industry Amor Benamor (CAB): one nursery, 150 farms and one canning plant. The functional unit is 1 kg of processed tomatoes ex-factory.

The surveys for the inventory data were carried out in the wilaya of Guelma, 560 km east of Algiers. This is one of the main production areas for industrial tomatoes due to the presence of the largest canning plant in Algeria (Amor Benamor canning plant - CAB) which collects the production of about 300 farmers and covers more than 50% of national demand for double concentrated tomato purée, estimated at 80,000 tons/year. We conducted face-to-face interviews with the lead engineer at the CAB nursery. The 150 farms were drawn at random from the list of 300 farmers registered with the CAB for the delivery of industrial tomatoes during the crop year 2010/2011. Data were collected by means of a questionnaire distributed to farm managers. The survey response rate was 100%. The canning plant is located in El Fedjouj (wilaya of Guelma) and boasts a processing capacity of 3,600 tons of fresh tomatoes per day. In 2011, the Benamor group increased its production capacities by taking over an old canning plant located in Ben Azzouz, which had been closed for more than a decade and which has a processing capacity of 2,400 tons of fresh tomatoes/day. The surveys were conducted by means of interviews carried out with the management, the human resources department and the production managers.

3. Results in terms of social performances

3.1. Workforces

Under the terms of ILO (International Labour Organisation) convention No. 138, the minimum age of children in the labour force must not be lower than the age at which they complete compulsory education (generally 15), with the exception of developing countries where a minimum age of 14 is accepted. The same convention stipulates that children under the age of 14 "can only be employed by or work in agricultural companies, either public or private, or in their buildings outside the hours scheduled for school education; if any such work should be undertaken, it must not adversely affect their assiduity at school".

Our survey reveals that children work in tomato fields during the harvest period (roughly 20 July to 20 August), this period coinciding with the school summer holidays. It also shows that these children are between 13 and 15 years old with 60% of them over the age of 14. The farms studied therefore comply relatively well with the provisions of the ILO convention with the exception that 40% of the children are under 14. Finally, children's wages are identical to those of any other farm employee. Among the farms in our sample, 12 children on average work per farm and per tomato picking season. At the canning plant, according to the company manager, child labour is not authorized. The youngest employee is over 18.

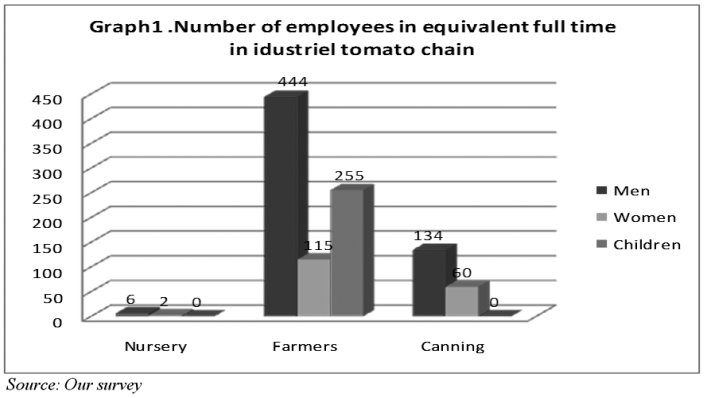
3.2. Working conditions

Four agricultural engineers and four technicians work within the ABCP nursery to produce hybrid varieties of tomato plants in a mostly mechanized process. The chili production season follows the tomato production season, requiring permanent work at the nursery from 8 a.m. to 5 p.m.

On the farms, the largest number of employees is recruited during the planting, earthling/hoeing and harvesting seasons. On average, 12 workers/ha are required for the earthling/hoeing activity while this figure rises to 20-30 workers/ha at harvest time. Half of the farms are located outside town (20-40 km), creating transport problems for both seasonal and permanent workers. This generally pushes them to use either tractor trailers or push-bikes and in some cases to hitch-hike. The harvest period occurs during the summer (20 July - 20 August) when the temperature exceeds 40°C. In this case, the employees generally prefer to start work at 5 a.m., finishing before midday. It should be noted that during the course of 2011, this period also coincided with the month of Ramadan (month of fasting) when the workers abstain from eating and drinking from sunrise to sunset, leading to difficult conditions. In the canning plant, two types of contract can be signed with the employees: a permanent contract for

administrative personnel and a seasonal contract for workers recruited during the tomato processing period. Transport is laid on for all employees who live a long way from the canning plant (all categories) and the work times are 8 a.m. to midday and 2 p.m. to 4.30 p.m.

In our system – from the nursery to the canning plant exit – we can see (Graph 1) that the most vulnerable sites are the farms as they use most labour and employ a large number of children; men are particularly present on farms whereas women work both on the farms and in the canning plant.



Source: Our survey

3.3. Health and safety at work

No farm employees are insured, not even the farm manager as 60% of these farmers are tenants and do not even carry a farmer's card. This is in stark contrast with the canning plant and the nursery where all the employees are insured, including contractual seasonal workers. An occupational health officer visits the canning plant and the nursery to conduct a monthly check-up of all permanent employees.

3.4. Equality, discrimination

On the farms, women only work during the harvest, with an average of 7-10 women/ha. They are between 40 and 60 years old and, at 600 DA/day (25 DA/crate harvested), their wages are identical to those of men. In the canning plant and the nursery, female employees receive the same wage as their male counterparts.

3.5. Freedom of assembly and collective bargaining

The farm managers who carry a farmer's card are allowed to form associations (e.g.: association of irrigating farmers); however, tenants do not enjoy this possibility. Workers at the canning plant and the nursery can form unions, but these activities must be conducted outside the working hours.

4. Value of labour and value of the product

4.1. Working hours necessary to produce 1kg of double concentrated tomato purée

Norris (2006) and Andrews *et al*. (2009) were the first to calculate working hours with the framework of the social L-CA. This calculation records additive indicators such as the number of working hours per organisation (and per unit process) in the life cycle chain. The idea is to analyse the extent to which an indicator of social responsibility can be incorporated into a value chain, i.e. to identify the links in the value chain where companies can implement practices relating to CSR. In our case, the calculation of working hours allows us to compare the hours of work required by each segment to produce one kilogram of double concentrated tomato purée with other Algerian canning plants and with other countries where concentrated tomato purée is produced; this comparison enables critical points to be highlighted and production time to be improved, either by adopting new technologies or by recruiting skilled labour.

In the nursery, the company provides 56% of the seedlings for the farmers in the region, representing the production equivalent of 18,144 tons of double concentrated tomato purée (DC tomato purée). The production time required to produce one kilogram of DC tomato purée is 0.012 min (Table 1). This performance is achieved thanks to a mechanized sowing procedure on trays of natural peat imported from Norway at a rate of 200 to 850 trays/hour (the equivalent of 8 million plants/year). This is followed by collective germination in an air-conditioned room which can last for between 36 and 48 hours. The plants are then placed in a "multi-chapelle" greenhouse with electrically controlled hydrometry, temperature and watering under the supervision of an engineer; this phase lasts 25 days and is optimised for the development of the plant.

Table1 - *Working time at the level of nursery (in minutes).*

	Working time
Number of employees	8
Number of working days	60
Number of working hours per day	8
Total number of working time in minutes	230 400
Total Production (number of plants)	18 144 000
Time for producing 1kg of DC (in mn)	0,012

Source: Our survey.

Table 2 - *Working time at the level of the farm (in minutes)*.*

	One hectare	1 Kg of tomatoes	1kg of DC
Farm = 9600ha	160 h	0,16 mn	0,8 mn

Source: Our survey
* One hectare produces an average of 60000 kg of tomatoes. 5 kilograms of fresh tomatoes are necessary for producing one kilogram of double concentrated tomatoes (DCT).

On the farms, the working time includes all the activities carried out until the product reaches the canning plant doors, including transport. This represents 0.8 min work (table 2) to produce one kilogram of double concentrated tomato purée.

In the canning plant studied, the working time is much lower than the national average, at 0.26 min / kg compared to 0.80 min/kg (table 3). This canning plant is characterized by a modern structure boasting innovative production resources including task automation, thereby reducing the working time per unit.

Table 3 - *Working time at the level of processing plant**.

	Working time
Number of employees	98
Number of working days	180
Number of working hours per day	8
Total in minutes	8467200
Total Production (kg)	32400000
Time for producing 1kg of DC (in mn)	0,26

Source: Our survey.
* With an annual production of 37000T (whose 32400T are from the processing of fresh tomatoes delivered by local producers).

The production of double concentrated tomato purée is governed by natural and biological factors which require a long phase on the farm (6 months). The work time necessary to produce one kilogram of double concentrated tomato purée is longer on the farm in light of the large number of seasonal workers. The production time at the nursery is only dependent on technical aspects.

In this context, the indicator of participation of children in the production of one kilogram of DC tomato purée is 0.0017. The number of children working in the fields is high (20 children per hectare) and their integration is greater than that of women.

4.2. Links between working time and product value

To assess the equity of distribution of the value, we can compare the retail price of tomato plants and the farm gate price of fresh tomatoes required to produce one kilogram of double concentrated tomato purée as well as the price of the end product ex-factory in relation to the work time required in each segment of the system (Table 4).

The nursery benefits from a large share of the value (7.6%) in relation to the working time deployed (1%); it is a highly technological, capital-based activity. The same observation can be made for the canning plant which takes

Table 4 - *The selling price and the work time required to produce one kilogram of double concentrated tomato*.

	Selling price		Working time	
	In DA	Share of each segment (%)	In minutes	Share of each segment (%)
Nursery (plants)	6	7,6	0,012	1
Farmers (fresh tomatoes)	40	43	0,8	75
Processing plant (tomato paste)	79	49,4	0,26	24

Source: Our survey.

49.4% of the value for less than a quarter of the final working time. This contrasts with the farm, where the working time is longer (6 months) and essentially depends on labour (75%) while it enjoys only 43% of the final value of the product.

5. Conclusive discussion

Despite the difficult working conditions on farms, the social performances observed in the industrial tomato value chain appear to be much more positive than negative for the employees dependent on the main company in Algeria. The value chain as a whole facilitates the participation of women and children in the production of double concentrated tomato purée while complying with certain international labour standards. While children are employed outside school periods, their age does not always comply as 40% of them are under the age of 14. It can't be considered as training, as these activities add themselves to school attendance. However, the company declares that it is not family work, as the children are remunerated.

No form of discrimination was observed either in the canning plants or on the farms; women earn the same wage as men and occupy the same posts with the same responsibilities. The working conditions are very much in favour of the canning plant and the nursery. Furthermore, these two segments of the system enjoy the major share of the product value. On the farms the onerous nature of the work, the precariousness of employment, the high level of child labour, the lack of any social protection and the impossibility of forming a union give rise to a weak social performance despite the apparent lack of discrimination in terms of wages.

The integration strategy adopted by the Company has borne fruit in terms of economic performance (high profit), and technical performance (better yields). Furthermore, the company showed an important financial performance, thanks to a greater and more regular supply (Bouzid and Bedrani, 2013). Social LCA shows that the most profitable segments of the production chain are those that present better work conditions. However, the whole activity depends on the agricultural production, which on the contrary is characterized by greater social difficulties.

A commitment to social responsibility would require

greater attention being paid to the agricultural segment with a view to improving the work conditions and well-being of the households dependent on the group. This example shows how treatment discrimination exists in a same company.The usefulness of the SLCA is precisely to highlight these internal disparities in a company or a food chain.

The hegemonic position held by the company on the market explains the strong competition among farmers in the region to obtain a supply contract with the company. Social attention given to tomato nurseries and to the industry could be extended, in the future, to the agricultural activities.

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