# METHODOLOGY OF SOCIAL IMPACT FOLLOW-UP MODELING

*The case study of a new aluminum smelter in Canada (Alma, Alcan)*[1]

CHRISTIANE GAGNON[2]
*Département des sciences humaines*
Groupe de recherche et d'intervention régionales
*Université du Québec à Chicoutimi*
*555, boul. de l'Université*
*Chicoutimi, Québec*
*Canada G7H 2B1*

## 1. Introduction

This article describes the methodology — steps, approaches, strategies and tools — used to conceive a social impact follow-up model, in relationship with the phases of a megaproject, for local and regional communities localized in an urbanized and northern settlement. Firstly, we will briefly introduce the major components of the aluminum smelter and its host region, the Saguenay—Lac-Saint-Jean (Quebec, figure 1) Secondly, the seven steps of the methodology will be briefly explained. In conclusion, some lessons will be drawn from the five-year social impact follow-up program, in the perspective of regional and local sustainable development according to a humanist approach (Gagnon, 1995).

## 2. The longitudinal case study of Alcan's latest aluminum smelter: brief description

### 2.1. THE MEGAPROJECT : ALCAN ALUMINUM SMELTER

In its modernization program, started in the seventies, the multinational Alcan decided to replace its old Söderberg technology pot rooms, located in Quebec. The concerned plants were Jonquière (Laterrière), Isle-Maligne (Alma) (see figure 1). The latest replacement smelter, with a production capacity of 407 000 metric tons of aluminum/year, represents a 1,7 billion US$ investment, the biggest private investment in North America 1998-2000. At the peak of construction (summer 2000) a total of 6,200 construction workers were on the

[1] This research program is sponsored (1997-2002) by Alcan, Centre québécois de recherche et de développement sur l'aluminiium (CQRDA), Ville d'Alma and Université du Québec à Chicoutimi (UQAC, Campagne de financement), the Fondation of UQAC and Développement économique Canada (DÉC).
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building site. For the exploitation phase of the smelter, 865 permanent employees will be required including 275 new ones.

The megaproject is located on an island, between the Grande and Petite Décharge rivers, down from Lake Saint-Jean (1350 $km^2$) and upriver of the Saguenay Fjord. The industrial site is situated 4 km from inner Alma City close to some agricultural, tourist, recreational and residential areas.

## 2.2. THE HOST REGION AND CITY: SAGUENAY--LAC-ST-JEAN AND ALMA

The Saguenay--Lac-St-Jean Region is geographically removed from the most important urban center of the province, Montreal (500 km north). Historically, its economy has been poorly diversified and based on the exploitation of natural resources (forest, water), on the exportation of primary products (aluminum ingots and wood). Major water features have been used for industrial and private hydroelectric production since the 1920's (see figure 1). This high hydroelectric potential has attracted Alcan and the pulp and paper industry (Gagnon, 1991). Since then, Alcan has implanted four smelters[3] in a 30 km radius.

Since the end of the seventies, the Alcan modernization program for the old smelters has caused numerous job losses in the host region. In fact, about 6,000 well-paid jobs were lost in fifteen years (the total active force for the metropolitan Chicoutimi-Jonquière census area was 70 865 in 1986)[4]. Since the beginning of the eighties, and despite the huge private investments in modern infrastructures, Saguenay--Lac-St-Jean's economy is still being dramatically affected by the highest unemployment rate in Canada for major cities. One major social impact is the demographic decrease, notably the inter-regional migration of young people. Consequently, with the announcement of the Alma replacement plant (1997), a feeling of optimism swept the region. Politicians and the population showed confident about the increase in the level of the regional economy and creation of well paid jobs (Quality of Life Survey on Alma citizens' perceptions, 1998). Then, through the environmental assessment procedure and public hearings, the regional and local communities have been showing a strong level of social acceptability. Because the largest cities of this resource region are strongly industrialized, they have to cope with the environmental issues. But at the same time, natural and recreational areas are closely integrated into the region. Regional society is also recognized for showing strong environmental values and a sense of belonging to their territory.

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[3] Costs energy are the most important production costs in this type of industry.
[4] Statistics Canada, 1986 census.

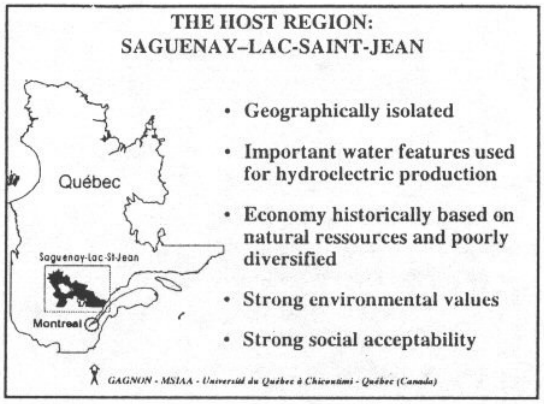


*Figure 1.* The host region : Saguenay-Lac-St-Jean

## 3. Social impact follow-up modeling : The 7 steps of the methodology

The methodology that leads to social impact follow up (SIFU) modeling is articulated to environmental impact assessment process, industrial project cycle and viable[5] community development. This methodology answers these two main questions: **what can we learn,** from participant observation, in real time and action context? And **what should be done next time?** Answering those questions leads to a more efficient environmental impact assessment and to a better understanding of the process of community social change. Also the SIFU is a participatory approach that could empower local communities (Gagnon, Howitt and Hirsch, 1993) and foster social learning in order to increase the capacities of a community to respond to individual and collective needs and aspirations.

This methodology is not the final operational model of the SIFU. It is the pathway, the steps used by the research team to make it. Many of these steps were conducted with the participation of the stakeholders, in the sense that the research program and its social issues, the methodology and the primary results, were presented and discussed with diverse publics and stakeholders[6]. The interactive research approach means that the researchers and stakeholders have exchanged or dialogued through the whole research process. The inductive one implied that the conceptual framework is firstly harvested by the empirical data. After almost five years of fieldwork, seven steps emerged:

1) identify relevant issues, stakeholders and define study zones and periods of time study,
2) document issues and social territories at the initial state,

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[5] This concept of viable local/regional development or community development refers to four main variables: See Gagnon, 1994.

[6] In 3 years about 75 presentations were done especially with the multipartite follow-up Committees.

3) verify the accuracy of the predictions *and* the proponent commitments,
4) establish relationships between observed changes and the new project,
5) learn lessons,
6) modeling follow up and social impact assessment and
7) communicate results to stakeholders and public.

## 3.1 BEFORE THE CONSTRUCTION PHASE OF THE MEGAPROJECT

The first two steps of the methodology were conducted before the construction of the megaproject.

### *3.1.1. Step 1: Identify relevant issues, stakeholders and define study zones and periods of time study*

The first step of the methodology regroups four distinct operations. First of all, it is necessary to identify a period of time, long enough to cover all the phases of the industrial project (planning, construction, exploitation) but also to follow the changes and the trends in the affected communities. It is also important to stress the major social issues relevant to the local and regional communities[7] at this given time. For example, such issues might be related to local economy, regional business creation, job creation for young people and women, housing, urban transport, landscape, governance and participation mechanisms, etc (see figure 2). The third operation consists in identifying the stakeholders who are going to take an active part in the whole process of the follow-up (FU). Finally, the study zones corresponding to the social issues mentioned earlier have to be identified.

The descriptive and grounded approaches were privileged. The practical tools, such as; documentary analysis and participant observation, press and public hearing reviews, statistical census, mapping, etc. were used in order to construct the base of the longitudinal case study and answer these questions :Who acts? What is it about? Which geographic level is more relevant to these social issues?

[7] These social issues could also be put on the national or international agenda but we have to size their territorial characteristics.

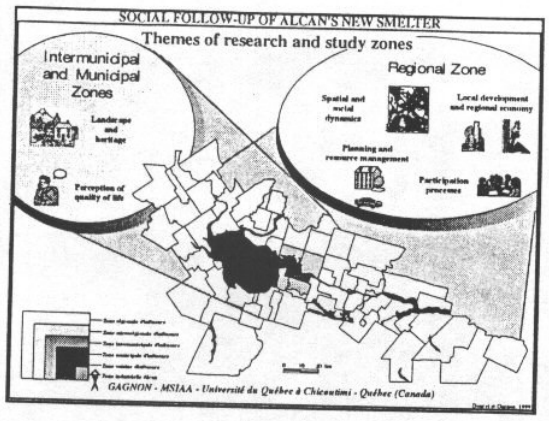


*Figure 2.* Themes of research and study zones

3.1.2. *Step 2: document issues and social territories at the initial state*

The second step of the methodology consists in documenting the social issues in relationship with the appropriate study zones identified in the previous step. Geographical, historical, institutional, socio-cultural and economical dimensions are considered as components of social territories. Again it is recommended to use different approaches, such as descriptive, qualitative spatial analysis, in order to produce a portrait of the affected communities, before the project (initial state).

The characterization of the social issues and territories, through a portrayal of the initial state, at a given time, is a very useful strategy. This initial state, conducted before the project, stresses a set of basic and specific indicators that will help to document the changes and the tendencies within the communities some years later (in this case, 5 years). Other research strategies include; conducting surveys and interviews to capture primary data related to the social issues. For instance, we have conducted a longitudinal survey on quality of life perceptions related to different periods, corresponding to the industrial project cycle: 1998, 2000, 2002. This survey, for instance, shows a change in the perception of local people on economy.

## 3.2. DURING CONSTRUCTION AND EXPLOITATION PHASES OF THE PROJECT

*3.2.1 Step 3: verify the accuracy of the predictions and the proponent commitments*

Once the construction and exploitation phases are ongoing, it is important to verify the accuracy of the predictions and the efficiency of the mitigation and maximization

measures[8], that have been assessed and planned within the environmental impact study (EIS), as well as assessing any unexpected social impact revealed by the FU. This is a technical but usual step to the FU.

A merge of several approaches (analytical, comparative, longitudinal and evaluative) helps for the completion of the verification. Less usual but very relevant in a perspective of local/regional viable development is to return to the proponent's commitments through all of the process (pre-consultation, EIS, public hearings transcription, governmental conditions). Another interesting strategy is to compare these commitments and the social demands expressed by the community. It might also be useful to return to the initial state report in order to delineate and enlighten the social changes to the social impacts of the specific project. Interviews with key informants and citizens allow us to triangulate the accuracy of the predicted impacts, the efficiency of mitigation and maximization measures, and assess the unexpected ones.

3.2.2 *Step 4: establish relationships between observed changes and the new project*

The most difficult task in impact assessment is to isolate the impact from the source or between identified social changes from the planned intervention. Even if we didn't limit our work to direct impact and a cause and effect pattern, we had to identify some links as well as some interactive chains. The multidimensional aspects of the community development and its territory and populations and the amount of data generated by the EIA process and the longitudinal FU requires us to adopt an integrated approach. Then the fourth step of the methodology is devoted to establish interfaces and links between identified changes and the new project. The questions are: Were the observed impacts linked to the project or to the social changes? If yes, to what extent? How? Because of these previous steps ( document social issues and verify the social impacts), it has been easier to make the links and make distinctions between the social changes and the social impacts experienced.

In order to integrate data and establish links between the diverse dimensions of the community's life, we have used some conceptual interfaces. Geographical information system (GIS), mapping analysis, schematization of identified relationships as well as comparison of results according to diverse sources and social demands are some powerful tools.

[8] The mitigation measures refer to the negative impacts and the maximization refer to the positive ones on the regional economy during the construction phase.

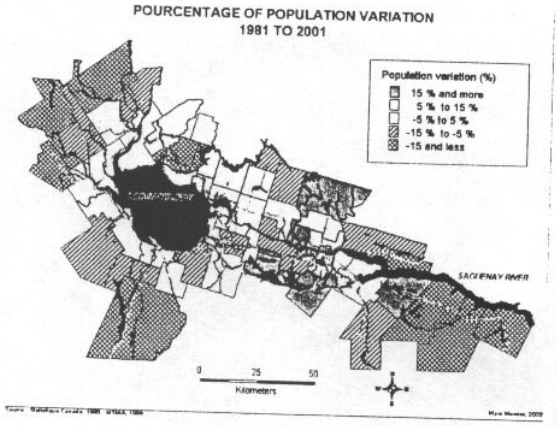


*Figure 3.* GIS mapping of complaints during construction phase

### *3.2.3 Step 5: learn lessons from the process of real time follow-up and stakeholder learning*

This step allows us to draw some lessons from the process of real time follow-up as well as acquire a better understanding of the stakeholders' values and actions. For each phase of the project (planning, construction, start-up, exploitation and even closure) and for each type of stakeholder (private, governmental decision makers, institutional and non-governmental organizations) the operational questions are: what was planned ?, what has been done? and what should be done ?. For instance, it appeared that EIS should include environmental and social prediction impacts as well as mitigation measures previously identified. Validating the results (lessons drawn and learned) with the stakeholders and conducting new interviews with the key informants might also be an interesting strategy.

### *3.2.4 Step 6: modeling follow-up and social impact assessment*

The sixth step consists in modeling the follow-up and the social impact assessment. The model will be built by conducting the generalization of all results, methods and processes: the territorial context, which include various notions like the different issues or the real impacts, the dynamics of the stakeholders (creation of local and regional follow-up committees) and the methods (strategies and tools) used during the follow up.

The model is a practical and operational tool for the FU Committees and decision makers regarding their next planned intervention. Once it has been conceived, it could be applied to future megaprojects within regional and urban planning related to a viable development perspective.

*Step 7: communicate results to stakeholders and public*
The final step of the methodology is about communicating the results of the research program to the different stakeholders and the public. This communication of the results is not limited to this step: during all the FU there is a regular exchange, as seen previously. It is crucial in this step to vulgarize the information transmitted to the stakeholders and the public in order to maximize the social learning and improve the community's capacity building (social capital, local and environmental governance). The chosen approach fosters a better partnership between the stakeholders and the affected and concerned individuals, groups and communities.

## 4. Conclusion : Some lessons drawn from the 5 years social impact follow up

After five years of applied, multidisciplinary and evaluative research on SIFU, some valuable lessons should be drawn. The ongoing SIFU shows the relevance of interfaces to integrate numerous data and issues. It also demonstrates the relevance to distinguish, but also to oppose social changes linked to the community's development and the social impacts linked to the project. The ongoing SIFU enlightens numerous unforeseen impacts and social changes. It also shows the need to take into account social impacts and improves social impact assessment in environmental impact assessment. Finally, the ongoing FU provides a strong means to plan and monitor the viable regional development.

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